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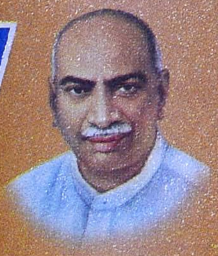

M.B.A

Second year

IV Semester

Elective II - Finance

INVESTMENT AND PORTFOLIO MANAGEMENT

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MADURAI KAMARAJ UNIVERSITY

MADURAI - 625 021.

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SYLLABUS

INVESTMENT AND PORTFOLIO MANAGEMENT

I.OBJECTIVES

The culmination of Security evaluation and accumulation of security related information is investment decision making. This subject deals in portfolio optimization, evaluation, revision, etc.

II Level of Knowledge

In-depth knowledge and Quantitative emphasis. A mini project involving computer operations is essentials as part of class assignment.

1.INTRODUCTION

Investment, Gambling, Speculation, different factors favoring investment, Investment process. Risk-Return attitudes, Age. Income level and other socio-cultural factors.

2. PORTFOLIO ANALYSIS

Dominance and efficiency portfolio's simple diversification. Markowitz diversification, derivation of capital market line, lagrangian function for minimization of risk, Stochastic dominance.

3.Capital Market Theroy

Assumptions, derivations, relaxing the assumptions, Graphical Analysis.

4. Institutional Investors

Maximizing utility, investment objectives of UTI, LIC, GIC and other private mutual funds, Graphical and mathematical utility analysis. Foreign institutional investors.

5. Portfolio performance Evaluation

Various schemes of Investment, Financial Institutions, Different techniques of evaluation, Net Asset Value, Return on Equity Investments, Yield on fixed income Security. Expenses ratio, Compoundd Total annual return, Sensitivity of NAV to Market Index, CMP/NAV etc. Sharpes, Treynors Indices measure, Decomposition of overall evaluation.

6. Efficient market Hypothesis

Weak form, semi0stronglyh efficient, strongly efficient full of hypothesis. Different tests used for above hypotheses. Results of research studies in India. Implications of Risk-Return Analysis, Fundamental ad Technical Analysis and Portfolio management.

7. Arbitrating Theory

Assumptions, General Derivation of the APT model, problems on two factor models only. Comparison of modern portfolio theory with APT study by Ross and Roll; problems of APT.

8. Multi Period Wealth Maximization

Utility of Terminal Wealth, Single period portfolio Management, Portfolio Revision, portfolio Rebalancing, Portfolio upgrading.

Investment planning horizon, Practical problems in portfolio Revision. Principles of selection and Revision of equity portfolio by EDWARD A mennis.

9. Applications of ex-post and Ex-Ante Security market Line

10. Computer Applications in Investment management

IV. Suggested Reading

1 Investment Analysis and Management
Jack Clark Francis Mc Graw Hill

2 Security Analysis and portfolio Management
Donald FisherRonald Jordon Prentic e Hall of India

3 Management of Investment
Jack Clark Francis Mc Graw Hill

V. References

1. Investments Sharpe, Bailey, Alexander Prentice Hall of India

VI. MAGAZINES

Journal of Finance, Journal Quantitative and Financial Analysis, Charted Financial Analyst, Journal of Portfolio management, Financial Analysis Journal.

VII. DAILIES

Economic Times, Financial Express, and Business Line.

UNIT I

INTRODUCTION TO INVESTMENT MANAGEMENT

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UNIT STRUCTURE

1.1 Introduction
1.2 Unit objectives
1.3 Meaning of Investment
1.4 Financial and Economic Meaning of Investment
1.5 Need for Investment Decision
1.6 Investment and Speculation
1.7 Attributes of Investment
1.8 Features of Investment Program
1.9 Investment Constraints
1.10 Approaches to Investment Decision Making
1.11 Investment Avenues
1.12 Investment Avenues Available in India
1.13 Summary
1,14 Answers to Check Your Progress
1.15 Review Questions
1.16 References

1.1 UNIT OBJECTIVES

1. To understand the concept of Investment
2. To give insight for financial and economic meaning of investment
3. To know various investment avenues in India
4. To approaching the investment decision making criteria

1.2 INTRODUCTION

This chapter discussed the concept of investment and distinguishes between financial and economic meaning of investment. It also outlines characteristics, objectives, importance, investment avenues, features and investment policies. Certain important questions are brought out giving clarifications to the nature of investment.

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1.3. MEANING OF INVESTMENT

Investment is the employment of funds with the aim of achieving additional income or growth in value. The essential quality of investment is that it involves "waiting" for a reward. It involves the commitment of resources which have been saved or put away from the current consumption in the hope that some benefits will accrue in future.

Definitions for investment

"Investment may be defined as the purchase by an individual or institutional investor of a financial or real asset that produces a return proportional to the risk assumed over some future investment period." – F. Amling

"Investment defined as commitment of funds made in the expectation of some positive rate of return. If the investment is properly undertaken, the return will commensurate with the risk the investor assumes."- Fisher & Jordan

Investment refers to acquisition of some assets. It also means the conversion of money into claims on money and use of funds for productive income earnings assets. In essence, it means the use of funds for productive purpose, for securing some objectives like, income, appreciation of capital or capital gains, or for further production of goods and services with the objective of securing yield

> *Check your Progress*
> 1. What is investment?

Types of Investments:

The various types of investment are:

- Cash investments: These include savings bank accounts, certificates of deposit (CDs) and treasury bills. These investments pay a low rate of interest and are risky options in periods of inflation.
- Debt securities: This form of investment provides returns in the form of fixed periodic payments and possible capital appreciation at maturity. It is a safer and more 'risk-free' investment tool than equities. However, the returns are also generally lower than other securities.
- Stocks: Buying stocks (also called equities) makes you a part-owner of the business and entitles you to a share of the profits generated by the company. Stocks are more volatile and riskier than bonds.
- Mutual funds: This is a collection of stocks and bonds and involves paying a professional manager to select specific securities for you. The prime advantage of this investment is that you do not have to bother with tracking the investment. There may be bond, stock- or

index-based mutual funds.

Derivatives: These are financial contracts the values of which are derived from the value of the underlying assets, such as equities, commodities and bonds, on which they are based. Derivatives can be in the form of futures, options and swaps. Derivatives are used to minimize the risk of loss resulting from fluctuations in the value of the underlying assets (hedging).

- Commodities: The items that are traded on the commodities market are agricultural and industrial commodities. These items need to be standardized and must be in a basic, raw and unprocessed state. The trading of commodities is associated with high risk and high reward. Trading in commodity futures requires specialized knowledge and in-depth analysis.
- Real estate: This investment involves a long-term commitment of funds and gains that are generated through rental or lease income as well as capital appreciation. This includes investments into residential or commercial properties

Multi-Dimensional World Of Investment Management

Before taking on the exercise of investment and its management, the investor is well advised to do the planning before hand and ask all the questions he or she can.

In answering these questions the investor would be able to get the aim (or objective). He would be empowered to think, analyze and act. The investor would be able to view and visualize the financial instruments available for investment. He would gain an understanding of when to invest and when to divest. This would also enable him to develop his investment system and also know where to go when he needs guidance.

To ask these questions before entering the multi-dimensional world of investment management is always a good idea. The questions that come to mind are:

Why to Invest?

What to Invest?

Where to Invest?

When to Invest?

How to Invest?

Why to invest?

The investor would want to invest mainly to increase the rate of return

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on his assets. Through our need to create a source of income, an additional source of income or to further create an asset base to fund future requirements (like a personal pension fund).

What To Invest?

The investor would mainly invest his time, effort and financial resources (including savings and reserves) in this endeavor of investment management.

Where To Invest?

There are many financial investment avenues available today to the investor, ranging from bank deposits and bonds, to investments in equity, debt, commodities, currencies, etc., to real estate, to doing a job of work.

When to Invest?

Here the investor would decide when to invest (or buy) and when to divest (or sell) a financial instrument, keeping the return on investment in mind. There is no Holy Grail, which would guide you to this decision.

How to Invest?

his would require the investor to have in place an investment system with all its checks and balances. This would include investment strategy and tactics with all their accompanying rules. Fundamental and technical analysis and their relevance to the financial instrument targeted for investment.

1.4. FINANCIAL AND ECONOMIC MEANING OF INVESTMENT

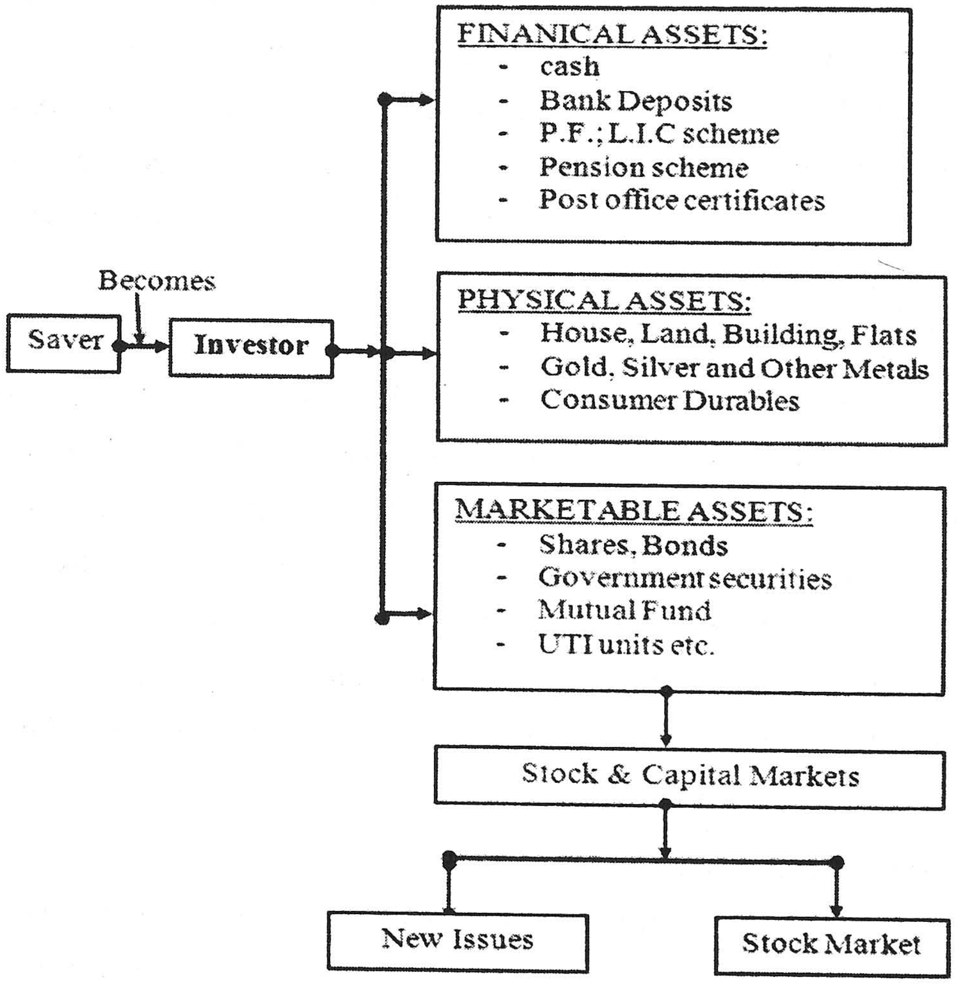
Financial investment involves of funds in various assets, such as *stock, Bond, Real Estate, Mortgages* etc. Investment is the employment of funds with the aim of achieving additional income or growth in value. It involves the commitment of resources which have been saved or put away from current consumption in the hope some benefits will accrue in future. Investment involves long term commitment of funds and waiting for a *reward in the future.*

From the point of view people who invest their finds, they are the supplier of 'Capital' and in their view investment is a commitment of a person's funds to derive future income in the form of interest, dividend, rent, premiums, pension benefits or the appreciation of the value of their principle capital. To the financial investor it is not important whether money is invested for a productive use or for the purchase of secondhand instruments such as existing shares and stocks listed on the stock exchange. Most investments are considered to be transfers of financial assets from one person to another.

Economic investment means the net additions to the capital stock of the society which consists of goods and services that are used in the production of other goods and services. Addition to the capital stock means an increase in building, plants, equipment and inventories over the amount of goods and services that existed.

The financial and economic meanings are related to each other because investment is a part of the savings of individuals which flow into the capital market either directly or through institutions, divided in 'new' and secondhand capital financing. Investors as 'suppliers' and investors as 'users' of long-term funds find a meeting place in the market.

So from above we know the term investment. The savers become the investors in the following term and invest in unique assets. So from above we know the term investment. The savers become the investors in the following term and invest in unique assets: Source: http://www.mbaknol.com/investment-management/financial-and-economic-meaning-of-investment



1.5 NEED FOR INVESTMENT DECISION

Investments are both important and useful in the context of present day conditions. The following points have made investment decision increasingly important.

1. Planning for retirement
2. Interest rate
3. High rate of inflation
4. Increase rate of taxation
5. Income
6. Investment channels

1. Planning for retirement:

A tremendous increase in working population, proper plans for life span and longevity have ensured the need for investment decisions. Investment decision have becomes significant as working people retire between the age 55 and 60. The life expectancy has increased due to improved living conditions, medical facilities etc. The earnings from employment should, therefore, be calculated in such a manner that a portion should be put away as savings. Saving from the from the current earning must be invested in a proper way so that principal and income thereon will be adequate to meet expenditure on them after their retirement.

2. Interest rate:

The level of interest rates is another factor for a sound investment plan. Interest rates may vary between one investments to other risky and non- risky investments. They may also differ due to different benefit schemes offered by the investments. These aspects must be considered before actually allocating any amount. A high rate of interest may not be the only factor favoring the outlet for investment. The investor has to include in his portfolio several kinds on investments. Stability of interest is as important as receiving a high rate of interest.

3. High rate of inflation:

In the conditions of inflation, the prices will rise and purchasing power of rupee will decline. On account of this, capital is eroded every year to the extent of rise in the inflation. The return on any investment should be regarded as positive. when such return compensates the effect of inflation. For

maintaining purchasing power stability, investors should carefully plan and invest their funds by making analysis.

1. The rate of expected return and inflation rate.
2. The possibilities of expected gain or loss on their investment.
3. The limitation imposed by personal and family considerations.

4. Increase rate of taxation:

Taxation is one of the crucial factors in a person's savings. Tax planning is an essential part of over all investment planning. If the investment or disinvestment in securities in made without considering the various provisions of the tax laws, the investor may find that most of his profits have been eroded by the payment of taxes. Proper planning could lead to a substantial increase in the amount of tax to be paid. On the other hand, good tax planning and investing in tax savings schemes not only reduces the tax payable by the investor but also helps him to save taxes on other incomes. Various tax incentives offered by the government and relevant provisions of the Income Tax Act, the Wealth Tax Act, are important to an investor in planning investments.

5. Income:

Income is also a factor in making a sound investment decision. The general increase in employment opportunities which gave rise to income level and avenues for investment, have lead to the ability and willingness of working population to save and invest such savings.

6. Investment Channels:

The growth and development of the country leading to greater economic activity has led to the introduction of a vast array of investments. Apart from putting aside savings in savings banks where interest is low, investors have the choice of a variety of instruments. The question to reason out is which is the most suitable channel? Which media will give a balanced growth and stability of return? The investor in his choice of investment will have to try and achieve a proper mix between high rate of return and stability of return to reap the benefits of both. Some of the instruments available are corporate stock, provident fund, life insurance, fixed deposits in corporate sector, Unit Trust Schemes and so on.

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Check your Progress

2. What is Speculation?

1.6 INVESTMENT AND SPECULATON

Traditionally investment is distinguished from speculation in three ways which are based on the factors of:

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a. risk
b. capital gain, and
c. time period.

a. Risk: the word 'risk' has a definite financial meaning. It refers to the possibility of incurring a loss in a financial transaction. In a broad sense investment Is considered to involve limited risk and is confined to those avenues where the principal is safe. 'Speculation' is considered as an involvement of funds of high risk. An example may be cited of the stock brokers' lists of securities which labels and recommends securities separately for investment and speculation purposes. Risk, however, is a matter of degree and no clear- cut lines of demarcation can be drawn between high risk and low risk and sometimes these distinctions are purely arbitrary. No investments are completely risk-free. Even if safety of principal and interest are considered, there are certain non-manageable risks which are beyond the scope of personal power. These risks are (a) the purchasing power risk- in other words it is the fall in the real value of the interest and principal (b) the money rate risk or the fall in market value when interest rate rises.

   These risks affect both the speculator and the investor. High risk and low risk are, therefore, general indicators to help an unde3rstanding between the terms investment and speculation.

b. Capital Gain: another distinction between investment and speculation exphasizes that if the motive is primarily to achieve profits through price changes, it is speculation. If purchase of securities is preceded by proper investigation and analysis and review to receive a stable return over a period of time it is termed as investment. Thus, buying low and selling high making a large capital gain is associated with speculation.

c. Time: the third difference is the consideration of the time period. A longer term fund allocation is termed as investment. A short-term holding is associated with trading for the 'quick turn' and is called speculation.

Investment and Gambling:

The difference between investment and gambling is very clear. From the above discussion it is established that investment is an attempt to carefully plan, evaluate and allocate funds in various investible outlets which offer safety of principal

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1.7 ATTRIBUTES OF INVESTMENT

To enable the evaluation and a reasonable comparison of various investment avenues, the investor should study the following attributes:

1. Rate of return
2. Risk
3. Marketability
4. Taxes
5. Convenience

Each of these attributes of investment avenues is briefly described and explained below.

1. Rate of return: The rate of return on any investment comprises of 2 parts, namely the annual income and the capital gain or loss. To simplify it further look below:

Rate of return = Annual income + (Ending price - Beginning price) / Beginning price

The rate of return on various investment avenues would vary widely.

2. Risk: The risk of an investment refers to the variability of the rate of return. To explain further, it is the deviation of the outcome of an investment from its expected value. A further study can be done with the help of variance, standard deviation and beta.

3. Marketability: It is desirable that an investment instrument be marketable, the higher the marketability the better it is for the investor. An investment instrument is considered to be highly marketable when:

It can be transacted quickly.

The transaction cost (including brokerage and other charges) is low.

The price change between 2 transactions is negligible.

Shares of large, well-established companies in the equity market are highly marketable. While shares of small and unknown companies have low marketability.

To gauge the marketability of other financial instruments like provident fund (which in itself is non-marketable). Then we would consider other factors like, can we make a substantial withdrawal without much penalty, or can we take a loan against the accumulated balance at an interest rate not much higher than our earning rate of interest on the provident fund account.

4. Taxes: Some of our investments would provide us with tax benefits while other would not. This would also be kept in mind when choosing the investment avenue. Tax benefits are mainly of 3 types:

Initial tax benefits. This is the tax gain at the time of making the investment, like life insurance.

Continuing tax benefit. Is the tax benefit gained on the periodic return from the investment, such as dividends.

Terminal tax benefit. This is the tax relief the investor gains when he liquidates the investment. For example, a withdrawal from a provident fund account is not taxable.

5. Convenience: Here we are talking about the ease with which an investment can be made and managed. The degree of convenience would vary from one investment instrument to the other.

1.8 FEATURES OF INVESTMENT PROGRAM

When you seek to create for yourself, or let an institution create for you an investment portfolio, there are several factors that need to play a part in it. The key idea with an investment portfolio is balance, and a very important second word would be protection. In order to get the best balance and protection for your assets, it will need to have the following five features.

Asset Management

Someone is going to have to be responsible for the management of your assets in the portfolio. Whether you do it yourself, as many people do, or let an institution do it for you, developing a solid investment portfolio means that it must be watched. Whoever has the responsibility needs to be able to check it on a regular basis and must be reliable. He or she should also be knowledgeable about the markets in order to make the best decisions.

Along with the watching, however, comes the responsibility to handle the assets to your best overall profit. Assets need to be removed occasionally from one stock or mutual fund and placed into a more productive one. The manager will need to know when this is necessary, because moving funds too often can only end up being more costly than it is worth.

Multiple Instruments

Creating the greatest amount of profit also includes the need to diversify. All of your assets should not be held in one stock, or even in one type of stock, such as communications. When all of your eggs are in one basket, it is

easy to lose them all at the same time. When you diversify, however, and place some in various types of stock, and some in bonds and mutual funds, what affects one market should not affect them all.

Constant Analysis

In order to ensure the greatest amount of profitability in an investment portfolio, it will need to be carefully watched. Daily changes need not be observed, however, but trends. The market overall fluctuates from day to day, but a long term point of view should indicate general trends of increasing or decreasing profitability. When the losses are either too great, or appear to be heading for trouble, it is time to make the transfer and place those assets into more profitable instruments.

Performance Objectives

A good investment portfolio should have performance objectives in place so that the one managing the assets knows how soon to move the assets. If you want the highest possible performance on your portfolio, then this will necessitate a lot of changing instruments or stocks - especially when the market fluctuates a lot - like it is now.

Risk Toleration

You will also need to have some way to indicate how much of a risk you are willing to take. Generally, the greater the profitability, the greater the risk to your assets. Decide on a percentage (that you could afford to lose, if necessary) that you want to invest into high profitability, and then leave the rest in a lower risk category. The lower risk assets, a percentage of your portfolio, should certainly include any money you intend to use for your retirement.

1.9 INVESTMENT CONSTRAINTS

Check your Progress

3. What are investment constraints?

When creating a policy statement, it is important to consider an investor's constraints. There are five types of constraints that need to be considered when creating a policy statement. They are as follows:

1. *Liquidity Constraints* - Liquidity constraints identify an investor's need for liquidity, or cash. For example, within the next year, an investor needs Rs.50,000 for the purchase of a new home. The Rs.50,000 would be considered a liquidity constraint because it needs to be set aside (be liquid) for the investor.
2. *Time Horizon* - A time horizon constraint develops a timeline of an

investor's various financial needs. The time horizon also affects an investor's ability to accept risk. If an investor has a long time horizon, the investor may have a greater ability to accept risk because he would have a longer time period to recoup any losses. This is unlike an investor with a shorter time horizon whose ability to accept risk may be lower because he would not have the ability to recoup any losses.

3. *Tax Concerns* - After-tax returns are the returns investors are focused on when creating an investment portfolio. If an investor is currently in a high tax bracket as a result of his income, it may be important to focus on investments that would not make the investor's situation worse, like investing more heavily in tax-deferred investments.

4. *Legal and Regulatory* - Legal and regulatory factors can act as an investment constraint and must be considered. An example of this would occur in a trust. A trust could require that no more than 10% of the trust be distributed each year. Legal and regulatory constraints such as this one often can't be changed and must not be overlooked.

5. *Unique Circumstances* - Any special needs or constraints not recognized in any of the constraints listed above would fall in this category. An example of a unique circumstance would be the constraint an investor might place on investing in any company that is not socially responsible, such as a tobacco company.

1.10 APPROACHES TO INVESTMENT DECISION MAKING

The stock market is thronged by investors pursuing diverse investment strategies which may be subsumed under four broad approaches.

1. Fundamental approach
2. Psychological approach
3. Academic approach
4. Eclectic approach

Fundamental Approach: The basic tenets of the fundamental approach, which is perhaps most commonly advocated by investment professionals, are as follows:

There is an intrinsic value of a security, which depends upon underlying economic (fundamental) factors. The intrinsic value can be established by a penetrating analysis of the fundamental factors relating to the company, industry, and economy.

At any given point of time, there are some securities for which the travailing market price will differ from the intrinsic value. Sooner or later, of course, the market price will fall in line with the intrinsic value.

- Superior returns can be earned by buying under valued securities (securities whose intrinsic value exceeds the market price) and selling over valued securities (securities whose intrinsic value is less than the market price).

Psychological Approach: The psychological approach is based on the premise that stock prices are guided by emotion rather than reason. Stock prices are believed to be influenced by the psychological mood of investors. When greed and euphoria sweep the market, prices rise to dizzy heights. On the other hand, when fear and despair envelop the market prices fall to abysmally low levels.

A conventional valuation which is established as the outcome of the mass psychology of a large number of ignorant individuals is liable to change violently as the result of a sudden fluctuation of opinion due to factors which do not really make much difference to the prospective yield.

Since psychic values appear to be more important than intrinsic values, the psychological approach suggest that it is more profitable to analyze how investors tend to behave as the market is swept by waves of optimism and pessimism which seem to alternate. The psychological approach has been described vividly as the castles in the air theory by some economists.

Hose who subscribe to the psychological approach or the castles in the air theory generally use some form of technical analysis which is concerned with a study of internal market data, with a view to developing trading rules aimed at profit making. The basic premise of technical analysis is that there are certain persistent and recurring patterns of price movements which can be discerned by analyzing market data. Technical analysts use a variety of tools like bar chart, point and figure chart, moving average analysis breadth of market analysis etc.

Academic Approach: Over the last five decades or so, the academic

community has studied various aspects of the capital market particularly in the advanced countries, with the help of fairly sophisticated methods of investigation. While there are many unresolved issues and controversies stemming from studies pointing in different directions, there appears to be substantial support for the following tenets.

1. Stock markets are reasonably efficient in reacting quickly and rationally to the flow of information. Hence, stock prices reflect intrinsic value fairly well. Put differently,
   - Market price = Intrinsic value
2. Stock price behavior corresponds to a random walk. This means that successive price changes are independent. As a result, past price behavior cannot be used to predict future price behavior.
3. In the capital market, there is a positive relationship between risk and return. More specifically the expected return from a security is linearly related to its systematic risk (also referred to as its market risk on non-diversifiable risk).

Eclectic approach: This approach draws upon all the 3 approaches discussed above. The basic rules of this approach are:

- Fundamental analysis would help us in establishing standards and benchmarks.
- Technical analysis would help us gauge the current investor mood and the relative strength of demand and supply.
- The market is neither well ordered nor speculative. The market has imperfections, but reacts reasonably well to the flow of information. Although some securities would be mispriced, there is a positive correlation between risk and return.

1.11 INVESTMENT AVENUES

There are a large number of investment instruments available today. To make our lives easier we would classify or group them under 4 main types of investment avenues. We shall name and briefly describe them.

1. Financial securities: These investment instruments are freely tradable and negotiable. These would include equity shares, preference shares, convertible debentures, non-convertible debentures, public sector bonds, savings certificates, gilt-edged securities and money market securities.

2. Non-securitized financial securities: These investment instruments are not tradable, transferable nor negotiable. And would include bank deposits, post office deposits, company fixed deposits, provident fund schemes, national savings schemes and life insurance.
3. Mutual fund schemes: If an investor does not directly want to invest in the markets, he/she could buy units/shares in a mutual fund scheme. These schemes are mainly growth (or equity) oriented, income (or debt) oriented or balanced (i.e. both growth and debt) schemes.
4. Real assets: Real assets are physical investments, which would include real estate, gold & silver, precious stones, rare coins & stamps and art objects.

Before choosing the avenue for investment the investor would probably want to evaluate and compare them. This would also help him in creating a well diversified portfolio, which is both maintainable and manageable.

Broadly speaking investment can be categorized as follows:

Equities

Equities are a type of security that represents the ownership in a company. Equities are traded (bought and sold) in stock markets. Alternatively, they can be purchased via the Initial Public Offering (IPO) route, i.e. directly from the company. Investing in equities is a good long-term investment option as the returns on equities over a long time horizon are generally higher than most other investment avenues. However, along with the possibility of greater returns comes greater risk.

Mutual funds

A mutual fund allows a group of people to pool their money together and have it professionally managed, in keeping with a predetermined investment objective. This investment avenue is popular because of its cost-efficiency, risk-diversification, professional management and sound regulation. You can invest as little as Rs. 1,000 per month in a mutual fund. There are various general and thematic mutual funds to choose from and the risk and return possibilities vary accordingly.

Bonds

Bonds are fixed income instruments which are issued for the purpose of raising capital. Both private entities, such as companies, financial institutions, and the central or state government and other government institutions use this

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instrument as a means of garnering funds. Bonds issued by the Government carry the lowest level of risk but could deliver fair returns.

Deposits

Investing in bank or post-office deposits is a very common way of securing surplus funds. These instruments are at the low end of the risk-return spectrum.

Cash equivalents

These are relatively safe and highly liquid investment options. Treasury bills and money market funds are cash equivalents.

Non-financial Instruments

Real estate

With the ever-increasing cost of land, real estate has come up as a profitable investment proposition.

Gold

The 'yellow metal' is a preferred investment option, particularly when markets are volatile. Today, beyond physical gold, a number of products which derive their value from the price of gold are available for investment. These include gold futures and gold exchange traded funds.

	Rate of return Annual Income	Rate of return Capital Appreciation	Risk	Marketability	Tax Benefit	Convenience
Financial Securities						
Equity	Low	High	High	High	Yes	High
Non-convertible Debentures	High	Low	Low	Average	Nil	High
Financial Securities (Non-securitized)						
Bank deposits	Low	Nil	Low	High	Yes	High
Provident fund	Nil	High	Nil	Average	Yes	High
Life insurance	Nil	High	Nil	Average	Yes	High
Mutual funds						
Growth equity	Low	High	High	High	Yes	High
Income debt	High	Low	Low	High	Yes	High
Real assets						
Real estate	Low	High	Low	Low	Limited	Average
Gold silver	Nil	Average	Average	Average	Nil	Average

The Emerging Investment Avenues

According to a study undertaken jointly by Merrill Lynch and Cap Gemini Ernst and Young, High Net worth Individuals [HNIs] or wealthy investors are proactive in portfolio management, risk management, consolidation financial assets and use of diversification strategies as actively as large institutions. HNIs are proactive in identifying new investment options and take inputs from professional advisors in volatile market conditions.

HNIs are dynamic in modifying their asset allocation and were among the first investors to move from equities to fixed income during 2001-2002 period of downturn in equity markets. They shifted back to equities when they identified favorable market trends.

Needs of wealthy investors

Wealthy investors being aware of the emerging investment opportunities use sophisticated investment strategies such as:-

- Leveraging on the professional advisorsýÿ capability to analyse market trends and make appropriate investments
- Searching for innovative products to enhance value
- Diversifying across various types of assets
- Investing across emerging geographies
- Consolidating financial information and assets

Investment products and avenues

- Managed products: Managed product service is the most popular investment strategy adopted by wealthy investors globally
- Real Estate: Wealthy investors have found this asset class very attractive and have invested directly in real estate and indirectly through real estate investment trusts.
- Art and passion: Wealthy investors also have their investment in art, wine, antiques, and collectibles
- Precious Metals: Gold and other precious metals are attractive investment options to balance the asset allocation
- Commodities: Wealthy investors have turned to commodities to offset the lower returns from fixed income securities.
- Alternative investments: Hedge funds and Private equity investments such as venture funds are becoming increasingly popular with wealthy investors to reduce the investment risks related to stock market fluc-

tuations. This is because these instruments have low correlation with equity asset class performance. Investment in non correlated assets, such as commodities helps to improve diversification of the portfolio amidst volatile market conditions.

Characteristics of wealthy investor

The wealthy investor of today is:-

- Young, educated and knowledgeable
- Well informed about global trends
- Willing to take risks
- Demanding and quality conscious
- Performance oriented in taking decisions and less loyal
- Techno savvy and seeks information from various sources
- Smart in looking for the best deal
- Not attracted by traditional status symbols that do not add value
- Hands on in checking investments, making deals and getting personally involved

Special needs of wealthy investors

The strategies and characteristics of wealthy investors has led to financial institutions innovating and expanding their product range to meet the growing demands of such investors.

A financial advisor should keep in mind the following special needs and expectations of the wealthy clients:-

- Demand broader range of services and skills: Wealthy clients not only are on the look out for multiple investment avenues, unlike other clients, but are also ready to face the risks associated with newer products.
- Net worth and goals need to be matched and assets need to be planned tax effectively: Since wealthy investors have surplus funds that can be passed on to the next generations and also come into the high tax paying category, investors need to advice them on the best methods to transfer their assets after death as well as on the best tax saving investments.
- Estate planning and tax planning: In-depth knowledge about tools of estate planning such as wills, trusts, and power of attorney is necessary. It is also important to know the succession rules and tax

rules to do effective tax planning resulting in minimal/no tax on transfer of assets.

Educate the client: Educating the client on various and different types of investment avenues that will suit him the best will prove very beneficial for the financial advisor. Wealthy clients, especially those who are self made, may assume that if they can make wealth in one industry they can manage their own portfolio as well. In such cases it is best to educate the client about the best investment options rather than trying to push a product; because if one is trying to push a product, the client is unlikely to get interested since he/she will be having enough peopie chasing him/her for investments.

1.12 INVESTMENT AVENUES AVAILABLE IN INDIA

Before you start your investment process, here are a few answers to some fundamental points that you might have in your mind.

Investment under Automatic Route with repatriation benefits

Non Resident Indians (NRIs), Person of Indian Origin (PIOs) and Overseas Corporate Bodies (OCBs) can invest in shares / convertible debentures of Indian companies under the Automatic Route without obtaining Government or RBI permission except for a few sectors where Foreign Investment Promotion Board (FIPB) / SIA permission is necessary, or where the investment can be made only up to a certain percentage of paid up capital.

Investment with Government approval

Investments not eligible under the Automatic Route, are considered by the FIPB, a high Powered inter-ministerial body under the chairmanship of Secretary, Department of Industrial Policy & Promotion, SIA, subject to sectoral limits / norms. These investments also enjoy full repatriation benefits.

Other investments with repatriation benefits

- v Investment in Domestic Mutual Funds
- v Investment in Bonds Issued By Public Sector Undertakings
- v Purchase of Shares Of Public Sector Enterprises
- v Deposits with Companies (For A Minimum Period Of 3 years)
- v Investment in Government Securities / Shares

Investments up to 100% equity without repatriation benefits

Capital Contribution to any Proprietary or Partnership Concern

NRIs can invest by way of capital contribution in any proprietary or partner-

ship concern in India provided the firm or the proprietary concern is not engaged in any agricultural/plantation activities or real estate business or Print Media on non-repatriation basis subject to the certain conditions

New Issues of Shares / Debentures of Indians Companies NRIs / OCBs as been ranted general permission to subscribe to the shares/convertible debentures of an Indian company on non-repatriation basis, and to an Indian company to issue shares or convertible debentures by way of new / rights / bonus issue to NRIs / OCBs on non-repatriation basis provided that the investing company is not engaged in agricultural / plantation activities or real estate business (excluding real estate development i.e. development of property or construction of houses) or chit fund or is not a Nidhi company.

Other investments by NRIs / OCBs without repatriation benefits

- o Investment in Non Convertible Debentures
- o Money Market Mutual Funds
- o Deposits With Companies
- o Commercial Papers (OCBs are presently not permitted)

LEARN TO PLAY YOUR INVESTMENTS RIGHT

Today getting the right kind of financial advice is critical. While planning financially, most people depend on someone who's called a 'financial planner'. Once you have chosen your financial planner, this person becomes an important part of your life, helping you through various investments, insurance, taxes benefits, basically guiding you in achieving your financial goals.

But said so, here are a few extremely important things you must follow to ensure you are never cheated by your financial planner.

- **Always make the cheques account payee only.**

Always write your cheques payable to mutual funds, brokerage firms, or insurance companies. Never write a cheque made payable to your planner. Cross all cheques as account payee, write your name and the purpose of the investment on the reverse of the cheque, mention your cheque number and bank details in the application form.

- **Do not have your financial planner as a joint owner or beneficiary on your accounts.**

The only place your advisor's name should appear on documents is as the broker /distributor /agent of record, with their code. Also ensure that after you hand over a form, no additions are made to it. The easiest way to ensure

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this is to cross out all empty places in the form, before handing it over to the planner.

• Do not lend money to your financial planner

At no point should your financial planner ask you for a short-term loan or use your financial information to support a cause of his own. Every planner is governed by a Code of Ethics and must maintain confidentiality at all times.

• Never sign a blank form or contract

Cross out all empty sections, especially the ones that contain details of joint holders and nominees. Never sign a blank instruction for repayment or encashment of your investments. Many investors have lost their entire investments by signing blank instructions.

• Do not let your financial planner forge your name

While you might think this could prove convenient, helping you save a lot of time, you are opening up to chances of fraud and even trouble with the law.

• Never let your financial planner use his address on your account statements

See that it's your address on the account statements, investment papers, etc. It is you who should receive the periodical statements directly from the bank, insurance company or brokerage firms, not your planner. Always insist on statements made on using proper firm stationery, not just a blank piece of paper

LAST-MINUTE TAX SAVING TIPS The financial year of 07-08 is coming to a close, so if you don't already have your taxes in order, there's no better time than to start now. Here's the where, what and how of things you can quickly invest in save on tax this year. 1. Life Insurance Premiums Your insurance agent should be able to help you out with this. 2. Bank Term Deposits You can get these from any scheduled bank in your area. 3. Public Provident Funds (PPF) You can open your PPF account in any of the following: - A branch of SBI or in any of its associates (except offices managed by a single officer/clerk) or any nationalized bank - A Head Post Office or grade sub-post office 4. Savings Certificates notified by the Government (NSCs) Head to your local post office for this. 5. Mutual Funds (ELSS)There are tons of players in the market for Mutual Funds. Pick up the latest copy for the Financial Times or call your agent. 6. Pension FundsLike Mutual Funds, there are several pension funds on offer today. Call your agent for one that suits

you.7. Tuition Fees Receipts of tuition fees for up to 2 kids at recognized universities and institutions are positive benefits for expenses made during the year.

How to create an investment policy statement

The policy statement should have the following information:

- **Purpose**: What is the money intended for? Retirement? New house fund? Children's education?
- **Investment time horizon**: When will the money be needed?
- **Asset allocation**: Will the portfolio be all stocks or all certificates of deposits or some combination?
- **Rebalancing**: How often will you rebalance?
- **Return expectation**: This section is optional but if you have an idea of what kind of return you are expecting then write it down.
- **Investments**: This section should outline what type of investments are eligible for your portfolio – ie large cap stocks on the S&P 500, index funds, etfs.
- **Benchmarks**: Another optional section – If you are an active investor then you might choose to measure your portfolio against an appropriate set of stock and bond indexes.

Investments alternatives

The investment alternatives ranging from financial securities to traditional non-security investments. The financial security may be negotiable or non-negotiable.

NEGOTIABLE SECURITIES

The negotiable securities are financial securities that are transferable. The negotiable securities may yield variable income or fixed income. Securities like equity shares are variable income securities. Bonds, debentures, Indra Vikas Patras, Kisan Vikas Patras, Government securities and money market securities yield a fixed income.

Variable Income Securities

Equity shares- The equity shares attract the interest of many. The stock market classifies shares into Growth shares, Income shares, Defensive shares, Cyclical sharesand Speculative shares.

i) Growth shares The stocks that have higher rate of growth than the industrial growth rate in profitability are referred to as growth shares.

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For example, the list of major gainers for 1999 is dominated by software sector stocks. The HCL and Infosystems share prices increased sharply.

ii) Income shares These stocks belong to companies that have comparatively stable operations and limited growth" opportunities. The bank shares and some of the fast moving consumer goods stocks such as Cadburys, Nestle and Hindustan Lever may be termed as income shares.

iii) Defensive shares Defensive stocks are relatively unaffected by the market movements. For example, a host of pharmaceutical stocks posted returns in excess of 50 per cent in 1998. The pharmaceutical industry owing to its inherent nature of demand is not affected by the down turn in the economy.

iv) Cyclical shares The business cycle affects the cyclical shares. The upward and downward movements of the business cycle affect the business prospects of certain companies and their stock prices. Such shares provide low to moderate current yield. Capital gain may be highly variable. For example, the automobile sector stocks are affected by the business cycles.

v) Speculative shares Shares that have lot of speculative trading in them are referred to as speculative shares. During the bull and bear phases of the market, this type of shares attracts the attention of the traders.

The stocks, which fall under one category in one period may switch over to another categury in another period. The classification should not be considered rigid. For example, growth shares may be speculative shares.

Check your Progress

4. Give examples of fixed income securities.

Fixed Income Securities

a) Preference shares A detailed description of the preference shares is given in chapter 1. Preference shares are no longer regarded as inferior to the equity capital. Corporate like Siemens has placed Rs.150 Cr. worth of preference shares. High tax paying companies or investors prefer to subscribe to the preference shares and investors with a low tax burden would prefer to go in for debt instruments. The conversion options provided in the by preference shares also make it attractive. The biggest advantage is the tax-exempt status of the preference share's dividend.

b) Debentures Corporate debentures are an option available to the investors who are willing to sacrifice liquidity for higher return. Manufacturing companies like Gujarat Industries Power and TISCO have issued debentures. If the debentures are not actively traded in the debt segment of the capital market, the investors may have to hold the instrument till maturity. If the instruments were actively traded in the secondary market, it would have perhaps changed hands at a considerable premium, thereby lowering the yield on par with the present interest rate. These reasons contribute towards high coupon rates on debentures.

c) Bonds Bonds are similar to the debentures but they are issued by the public sector undertakings. The value of the bond in the market depends upon the interest rate and the maturity. The coupon rate is the nominal interest rate offered on the bonds. The coupon rate is contractual involving the terms and conditions of the issuance of the debt security. Being contractual it cannot be changed during the tenure of the instrument. The investors are not affected by lowering of the bank rates. When the bank rates are lowered, actually, the value of the bonds, which are carrying interest rates above the bank rate would appreciate. lOBI and ICICI have issued various bonds to suit the needs of the investors. Some of them are deep discount bond, education benefit bond, retirement benefit bond and index bond.

d) IVPs and KVPs These are saving certificates issued by the post office with the name Indira Vikas Patra (IVP) and Kisan Vikas Patra (KVP). The IVPs are in the face value of R~500, 1000 and 5000. The KVPs are in the denomination of Rs, 1000, 5000 and 10000. The capital is doubled in 5.5 years with the return of 13.47%. IVPs are like bearer bonds, transferable by hand delivery and therefore are attractive to the persons who prefer cash transactions. No income tax concession is available for this type of investment.

e) Government securities The securities issued by the Central, State Government and Quasi Government agencies are known as Government securities or gilt edged securities. As Government guaranteed security is a claim 1m the Government, it is a secured financial instrument, which guarantees the income and the capital. The rate of interest on these securities is relatively lower because of their high liquidity and safety.

f) Money market securities Money market securities have very short term

maturity say less than a year. Common money market instruments are:

Treasury bills

Commercial paper

Certificate of deposit

i) Treasury bills A treasury bill is basically an instrument of short term borrowing by the Government of India. To develop the treasury bill market and provide investors with financial instruments of varying short-term maturities and to facilitate the cash management requirements of various segments of the economy, in April 1997 treasury bills of varied maturities were introduced. 14-day treasury bill on a weekly basis was introduced from June 6, 1997. In the second half of 1997-98, treasury bill of 28-day was introduced on aucti9n basis. Further, it was decided to reintroduce 182-day treasury bills through auctions. Generally, treasury bills are of 91-days. Since the interest rates offered on the treasury bills are very low, individuals very rarely invest in them.

ii) Commercial papers Commercial paper is a short-term negotiable instrument with fixed maturity period. It is an unsecured promissory note issued by the company either directly or through bank/ merchant banks. The maturity period of commercial paper was originally three (minimum) to six (maximum) months from the date of issue. In Oct 1993, the maximum period was extended to one year. The commercial papers are sold at a discount and redeemed at their face value. The discounted value implicates the interest rate. The denomination of commercial paper is high. Mostly the companies and institutional investors favour them. The minimum maturity of CP was brought down from 3 months to 30 days.

iii) Certificate of deposit The certificate of deposit is a marketable receipt of funds deposited in a bank for a fixed period at a specified rate of interest. They are bearer documents and readily negotiable. The denominations of the CD and the interest rate on them are high. It is mainly preferred by institutional investors and companies rather than the individuals. The minimum size of the certificate is Rs 10 lakh. The additional amount is issued in multiples of Rs 5 lakh.

NON-NEGOTIABLE SECURITIES

The non-negotiable financial investment as the name itself suggests is not transferable. This is also known as non-securitised financial investments.

Deposit schemes offered by the post offices, banks, companies, and non-banking financial· companies are of this category. The tax-sheltered schemes such as public provident fund, national savings certificate and national savings scheme are also non-securitised financial investments.

(A) Deposits

Deposits earn fixed rate of return. Even though bank deposits resemble fixed income securities they are not negotiable instruments. Some of the deposits are deält subsequently.

a) Bank deposits It is the simple investment avenue open for the investors. He has to open an account and deposit the money. Traditionally the banks offered current account, śavings account and fixed deposit account. The deposits in the banks are considered to be safe because of the RBI regulation. The risk averse investors prefer the bank deposits.

b) Post office deposits Like the banks, post office also offers fixed deposit facility and monthly incomescheme. Post office Monthly Income Scheme is a popular scheme for the retired. An interest rate of 13% is paid monthly. The term of the scheme is 6 years, at the end of which a bonus of 10% is paid. The annualised yield to maturity works out to be 15.01% per annum. After three years, premature closure is allowed without any penalty. If the closure is after one year, a penalty of 5% is charged.

c) NBFC deposits In recent ỳears, there has been a significant increase in the importance of non-banking financial companies in the process of financial intermediation. The NBFC comes under the purview of the RBI.The amendment of RBI Act in Jan 1997, made registration compulsory for the NBFCs.

   i) Period The maturity period ranges from few months to five years. It varies from company to company. For example, the Birla Global Finance, the company belonging to Aditya Birla group accepts deposits with maturity from 3-5 years.

   ii) Maximum limit The limit for acceptance of deposit has been based on the credit rating of the company. The NBFCs not having net owned funds ofRs 25 lakh are not entitled to accept deposits.

   iii) Internet NBFCs offer interest rate higher than the commercial bank on public deposit. The interest rate differs according to maturity period. There is a disparity in the interest rate among the companies

Check your Progress

5. Give the examples of variable return securities.
6. Explain various approaches to study the investment management.

in accordance with the credit ratings and policies of the companies.

iv) Security Security of the deposits of the NBFCs is much lower than the depositsw improve the liquidity ofNBFCs the percentage of liquid assets required to be maint has been enhanced from 12.5 percent to 15 percent with effect from April 1999 respepany Law Board is authorised to direct the defaulting NBFCs to repay the deposits. I strict rules and regulations laid down by RBI the default rate is high in the case of NE

(B) Tax sheltered savings schemes

Tax sheltered savings schemes offer tax relief to those who participate in their schemes. The important tax sheltered savings schemes are

=> Public Provident Fund Scheme

=> National Savings Scheme

=> National Savings Certificate VIII series

a) Public provident fund scheme (PPF)

PPF earns an interest rate of 12 percent per year, which is exempted from the income tax under sec 88. The individuals and Hindu undivided families can participate in this scheme. The maximum limit per annum for the deposit is Rs. 6O,OOO. The interest is accumulated in the deposit. It provides early withdrawal facilities from 7th year and every year thereafter, the account holder has an option to withdraw 50 per cent of the balance to his credit 4 years ago or 1 year ago whichever is lower. The facility makes PPF a self-sustaining account from 7th year onwards.

b) National savings scheme (NSS)

This scheme helps in deferring the tax payment. Individuals and HUF are eligible to open NSS account in the designated post office. The NSS-87 gives100per cent income tax rebate but the interest as well as the capital are fully taxable if withdrawn during their lifetime. Investments in the NSS scheme, with a lock in period of 4 years qualify for a rebate of 20 per cent under Section 88 of the Income Tax Act, subject to a maximum of Rs 12,000. The investment also earns an interest rate of 11per cent per year covered by Sec 80L. Compared to other tax savings' instruments the return offered by this scheme is lower.

On the liquidity aspect, withdrawal is permitted at any time after four years from the end of the financial year in which the account is opened. The

entire amount can be withdrawn. The account can be closed on the expiry of 4 years. There is no fixed tenure for investment. One can also keep the account alive and earn interest at 11percent per annum.

As a tax saving instrument "anytime" withdrawal after 4 years is the only interesting feature to the prospective investor. The tax deduction at source at the rate of 20 percent on the entire amount withdrawn has proved too costly to the investors.

c) National savings certificate (6 yrs.) - III

This scheme is offered by the post office.

These certificates come in the denominations of Rs 500, 1,000, 5,000 and 10,000. The contribution and the interest for the first 5 years are covered by Sec 88. The interest is cumulative at the rate of 12% per annum and payable biannually is covered by Sec 80L. No withdrawals are permitted. There is no deduction at maturity.

(c) Life Insurance

Life insurance is a contract for payment of a sum of money to the person assured (or to the person entitled to receive the same) on the happening of event insured against. Usually the contract provides for the payment of an amount on the date of maturity or at specified dates at periodic intervals or if unfortunate death occurs. Among other things, the contracts also provide for the payment of premium periodically to the corporation by the policy holders. Life insunmce eliminates risk. The major advantages of life insurance are given below:

i) Protection Saving through life insurance guarantees full protection against risk of death of the saver. The full assured sum is paid, whereas in other schemes only the amount saved is paid.

ii) Easy payments For the salaried people the salary savings' schemes are introduced. Further, there is an easy instalment facility method of payment through monthly, quarterly, half yearly or yearly mode.

iii) Liquidity Loans can be raised on the security of the policy.

iv) Tax relief Tax relief in Income Tax and Wealth Tax is available for amounts paid by way of premium for life insurance subject to the tax rates in force.

MUTUAL FUNDS

Mutual fund is another investment alternate. It is of recent origin in India. Within a short span of time several financial institutions and banks have floated varieties of mutual funds. The investors with limited funds can invest in the mutual funds and can have the benefits of the stock market and money market investments as specified by the particular fund

Investment companies or investment trusts obtain funds from large number of investors through sale of units. The funds collected from the investors are placed under professional management for the benefit of the investors. The mutual funds are broadly classified into open-ended scheme and close-ended scheme.

Open-ended Scheme

The open-ended scheme offers its units on a continuous basis and accepts funds from investors continuously. Repurchase is carried out on a continuing basis thus, helping the investors to withdraw their money at any time. In other words, there is an uninterrupted entry and exit into the funds. The open-end scheme has no maturity period and they are not listed in the stock exchanges. Investor can deal directly with the mutual fund for investment as well as redemption. The open-ended fund provides liquidity to the investors since the repurchase facility is available. Repurchase price is fixed on the basis of net asset value of the unit. In 1998 the open-ended schemes have crossed 80 in number.

Close-ended Scheme

The close-ended funds have a fixed maturity period. The first time investments are made when the close end scheme is kept open for a limited period. Once closed, the units are listed on a stock exchange. Investors can buy and sell their units only through stock exchanges. The demand and supply factors influence the prices of the units. The investor's expectation also affects the unit prices. The market price may not be the same as the net asset value.

Sometimes mutual funds with the features of close-ended and open-ended schemes are launched, known as interval funds. They can be listed in the stock exchange or may be available for repurchase during specific periods at net asset value or related prices.

1.13 SUMMARY

Investment is the employment of funds with the aim of achieving additional income or growth in value. Investment refers to acquisition of some

assets. It also means the conversion of money into claims on money and use of funds for productive income earnings assets. Financial investment involves of funds in various assets, such as *stock, Bond, Real Estate, Mortgages* etc. Investment is the employment of funds with the aim of achieving additional income or growth in value. It involves the commitment of resources which have been saved or put away from current consumption in the hope some benefits will accrue in future. Investment involves long term commitment of funds and waiting for a *reward in the future.*

1.14 ANSWERS TO CHECK YOUR PROGRESS

1. Investment defined as commitment of funds made in the expectation of some positive rate of return.
2. Speculation' is considered as an involvement of funds of high risk.
3. *Liquidity Constraints, Time Horizon Tax Concerns Legal and Regulatory Unique Circumstances* .
4. Debentures, Bonds and preference Shares.
5. Equity Shares : Share of Sunrise Companies and Blue Chip Companies
6. Fundamental approach, Psychological approach, Academic approach and Eclectic approach

1.15 REVIEW QUESTIONS

1. Define the term investment. How is it different from Speculation?
2. State various approaches to investment decision making.
3. Explain various investment avenues available in India.
4. Distinguish between investment, speculation and gambling.
5. Explain various constraints of investments

1.16 REFERENCES

1. INVESTMENT MANAGEMENT
   by Theory and Practice – Sultan chand and Sons.
2. PORTFOLIO MANAGEMENT
   by S. Kevin
3. SECURITY ANALYUSIS AND PORTFOLIO MANAGEMENT
   by S. Kevin
4. SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT
   by M. Renganatham and R. Madhumathi

RISK

UNIT STRUCTURE

2.1 INTRODUCTION
2.2 MEANING OF RISK
2.3 SOURCES OF RISK
2.4 CAN WE REDUCE THE RISK EXPOSURE?
2.5 OTHER RISKS
2.6 MEASUREMENT OF SYSTEMIC RISK 1
2.7 BETA
2.8 HOW TO USE BETA
2.9 PROBLEMS WITH BETA
2.10 HOW DO DIFFERENT TYPES OF RISK INFLUENCE A PORTFOLIO?
2.11 SUMMARY
2.12 ANSWERS TO CHECK YOUR PROGRESS
2.13 REVIEW QUESTIONS
2.14 REFERENCES

UNIT OBJECTIVES

1. To understand the nature of risk
2. To learn the essence of risk in an investment
3. To attempt to anticipate the kinds of risk measurement techniques
4. To evaluate the risk associated with return.

2.1 INTRODUCTION

What four letter word should pop into mind when the stock market takes a harrowing nose dive? No, not those. R-I-S-K. Risk is the potential for realizing low returns or even losing money, possibly preventing you from meeting important objectives, like sending your kids to the college of their choice or having the retirement lifestyle you crave. But many financial advisers and other experts say that these days investors aren't taking the idea of risk as seriously as they should, and they are overexposing themselves to stocks.

"The market has been so good for years that investors no longer believe there's risk in investing," says Gary Schatsky, a financial adviser in New York.

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"And when the market drops hundreds of points and rebounds immediately, that belief is confirmed." The danger is that when the market declines and stays down for months — as some analysts predict it eventually will — investors won't be able to meet their short-term financial goals.

Or, they will panic and sell their investments as their shares are declining in value, which is the worst possible time. So before the market goes down and stays down, be sure that you understand your tolerance for risk and that your portfolio is designed to match it.

Assessing your risk tolerance, however, can be tricky. You must consider not only how much risk you can afford to take but also how much risk you can stand to take. What you can afford depends mainly on your time horizon — how long before you will need the money. If your investments are targeted for your child's college tuition in three years, for instance, your financial ability to take on risk is low because you may not have time to recover if the value of your portfolio declines.

Check your Progress

1. What is Risk?

2.2 MEANING OF RISK

Risk is the potential that a chosen action or activity (including the choice of inaction) will lead to a loss (an undesirable outcome). The notion implies that a choice having an influence on the outcome exists (or existed). Potential losses themselves may also be called "risks". Almost any human endeavor carries some risk, but some are much more risky than others.

2.3 SOURCES OF RISK

Risk in holding securities is generally associated with possibility that realized returns will be less than the returns that were expected. Forces that contribute to variations in return price or dividend/interest constitute elements of risk. Some influences are external to the firm, cannot be controlled, and affect large numbers of securities. Other influences are internal to the firm and are controllable to a large degree.

In investments, those forces that are uncontrollable, external and broad in their effect are called sources of systematic risk. Conversely, controllable internal factors somewhat peculiar to industries and/or firms are refereed to as sources of unsystematic risk.

Systematic Risk

Systematic risk refers to that portion of total variability in return caused by factors affecting the prices of all securities. Economic, political, and sociological changes are sources of systematic risk.

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Their effect is to cause prices of nearly all individual common stocks and/or all indivdidual bonds to move together in the same manner. For example, if the economy is moving toward a recession and corporate profits shift downward, stock prices may decline across a broad front.

On the average, 50 percent of the variation in a stock's price can be explained by variation in the market index. In other words, about one-half the total risk in an average common stock is systematic risk. Systematic risk includes:

Market Risk

Market risk is caused by investor reaction to tangible as well as intangible events. Expectations of lower corporate profits in general may cause the larger body of common to fall in price.

The basis for the reaction is a set of real, tangible events political, social, or economic.

Intangible events are related to market psychology.

Interest-Rate Risk

Interest-rate risk refers to the uncertainty of future market values and of the size of future income, caused by fluctuations in the general level of interest rates.

Purchasing-Power Risk

Market risk and interest-rate risk can be definded in terms of uncertainties as to the amount of current dollars to be received by an investor. Purchasing-power risk is the uncertainityof the purchasing power of the amounts to be received. In more everyday terms, purchasing-power risk refers to the impact of inclation or deflation on an investment.

Unsystematic Risk

Unsystematic risk is the portion of total risk that is unique or peculiar to a firm or an industry, above and beyond that affecting securities markets in general. Factors such as management capability, consumer preferences, and labor strikes can cause unsystematic variability of returns for a company's stock. Because these factors affect one industry and/or one firm, they must be examined separately for each company. Unsystematic risk includes:

Business Risk

Business risk is a function of the operating conditions faced by a firm Business risk can be divided into two broad categories: external and internal.

Check your Progress

2. State various types of risk?
3. What is Systematic Risk?

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Internal business risk is largely associated with the efficiency with which a firm conducts its operations with in the broader operating environment imposed upon it. Each firm has its own set of internal risks, and the degree to which it is successful in coping with them is reflected in operating efficiently.

External business risk is the result of operating conditions imposes upon the firm by circumstances beyond its control. Each firm also faces its own set of external risks, depending upon the specific operating environmental factors with which it must deal.

Financial Risk

Financial risk is associated with the way in which a company finances its activities. We usually gauge financial risk by looking at the capital structure of a firm. The presence of borrowed money of debt in the capital structure creates fixed payment in the form of interest that must be sustained by the firm.

Financial risk is avoidable risk to the extent that managements have the freedom to decide to borrow or not to borrow funds. A firm with no debt financing has no financial risk. By engaging in debt financing, the firm changes the characteristic of the earnings stream available to the common-stock holders.

Specifically, the reliance on debt financing, called financial leverage, has at three important effects on common-stock holders. Debt financing

(1) increases the variability of their returns,

(2) affects their expectations concerning their returns, and

(3) increases their risk of being ruined.

2.4 CAN WE REDUCE THE RISK EXPOSURE?

Every investor wants to guard himself from the risk. This can be done by understanding the nature of the risk and careful planning

Market Risk Protection

(a) The investor has to study the price behaviour of the stock. Usually history repeats itself even though it is not in perfect form. The stock that shows a growth pattern may continue to do so for some more period.

(b) The standard deviation and beta are available for the stocks that are included in the indices. The National Stock Exchange News bulletin provides this information.

Looking at the beta values, the investor can gauge the risk factor and make wise decision according to his risk tolerance.

Further, the investor should be prepared to hold the stock for a period of time to reap the benefits of the rising trends in the market. He should be careful in the timings of the purchase and sale of the stock. He should purchase it at the lower level and should exit at a higher level.

Often suggested solution for this is to hold the investment sells it in the middle due to fall in the interest rate, the capital invested would experience tolerance.

(b) The investors can also buy treasury bills and bonds of short maturity. The portfolio manager can invest in the treasury bills and the money can be reinvested in the market to suit the prevailing interest rate.

(c) Another suggested solution is to invest in bonds with different maturity dates. When the bonds mature in different dates, reinvestment can be done according to the changes in the investment climate. Maturity diversification can yield the best results.

Protection against Inflation

(a) The general opinion is that the bonds or debentures with fixed return cannot solve the problem. If the bond yield is 13 to 15 % with low risk factor, they would provide hedge against the inflation .

(b) Another way to avoid the risk is to have investment in short-term securities and to avoid long term investment. The rising consumer price index may wipe off the real rate of interest in the long term.

(c) Investment diversification can also solve this problem to a certain extent. The investor has to diversify his investment in real estates, precious metals, arts and antiques along with the investment in securities. One cannot assure that different types of investments would provide a perfect hedge against inflation. It can minimise the loss due to the fall in the purchasing power.

2.5 OTHER RISKS

Investment Risk

Risk is an inherent part of investing. Generally, investors must take greater risks to achieve greater returns. Those who do not tolerate risk very well have a relatively smaller chance of making high earnings than do those with a higher tolerance for risk.

It's crucial to understand that there is an inescapable trade-off between investment performance and risk: Higher returns are associated with higher

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risks of price fluctuations. Stocks historically have provided the highest long-term returns of the three major asset classes and have been subject to the biggest losses over shorter periods. At the other extreme, short-term cash investments are among the safest of investments when it comes to price stability, but they have provided the lowest long-term returns.

Over short periods—even periods lasting a few years—lower-risk investments may provide better returns than higher-risk investments. But historically over long periods, riskier assets have provided higher returns.

There are various types of risk. We will discuss a few here:

Personal Risks

This category of risk deals with the personal level of investing. The investor is likely to have more control over this type of risk compared to others.

Timing risk is the risk of buying the right security at the wrong time. It also refers to selling the right security at the wrong time. For example, there is the chance that a few days after you sell a stock it will go up several dollars in value. There is no surefire way to time the market.

Tenure risk is the risk of losing money while holding onto a security. During the period of holding, markets may go down, inflation may worsen, or a company may go bankrupt. There is always the possibility of loss on the company-wide level, too.

Company Risks

There are two common risks on the company-wide level. The first, financial risk, is the danger that a corporation will not be able to repay its debts. This has a great affect on its bonds, which finance the company's assets. The more assets financed by debts (i.e., bonds and money market instruments), the greater the risk. Studying financial risk involves looking at a company's management, its leadership style, and its credit history.

Management risk is the risk that a company's management may run the company so poorly that it is unable to grow in value or pay dividends to its shareholders. This greatly affects the value of its stock and the attractiveness of all the securities it issues to investors.

Liquidity risk is the risk that an investment, when converted to cash, will experience loss in its value.

Inflation risk is the danger that the dollars one invests will buy less in the future because prices of consumer goods rise. When the rate of inflation

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rises, investments have less purchasing power. This is especially true with investments that earn fixed rates of return. As long as they are held at constant rates, they are threatened by inflation. Inflation risk is tied to interest rate risk, because interest rates often rise to compensate for inflation.

Exchange rate risk is the chance that a nation's currency will lose value when exchanged for foreign currencies.

Reinvestment risk is the danger that reinvested money will fetch returns lower than those earned before reinvestment. Individuals with dividend-reinvestment plans are a group subject to this risk. Bondholders are another.

National And International Risks

National and world events can profoundly affect investment markets.

Economic risk is the danger that the economy as a whole will perform poorly. When the whole economy experiences a downturn, it affects stock prices, the job market, and the prices of consumer products.

> *Check your Progress*
>
> 4. What is Unsystematic Risk?

Industry risk is the chance that a specific industry will perform poorly. When problems plague one industry, they affect the individual businesses involved as well as the securities issued by those businesses. They may also cross over into other industries. For example, after a national downturn in auto sales, the steel industry may suffer financially.

Tax risk is the danger that rising taxes will make investing less attractive. In general, nations with relatively low tax rates, such as the United States, are popular places for entrepreneurial activities. Businesses that are taxed heavily have less money available for research, expansion, and even dividend payments. Taxes are also levied on capital gains, dividends and interest. Investors continually seek investments that provide the greatest net after-tax returns.

Political risk is the danger that government legislation will have an adverse affect on investment. This can be in the form of high taxes, prohibitive licensing, or the appointment of individuals whose policies interfere with investment growth. Political risks include wars, changes in government leadership, and politically motivated embargoes

2.6 MEASUREMENT OF SYSTEMIC RISK

According to the Property Casualty Insurers Association of America, there are two key assessments for measuring systemic risk, the "too big to fail" (TBTF) and the "too interconnected to fail" (TICTF) tests. First, the TBTF test is the traditional analysis for assessing the risk of required government

intervention. TBTF can be measured in terms of an institution's size relative to the national and international marketplace, market share concentration, and competitive barriers to entry or how easily a product can be substituted.

Second, the TICTF test is a measure of the likelihood and amount of medium-term net negative impact to the larger economy of an institution's failure to be able to conduct its ongoing business. The impact is measure beyond the institution's products and activities to include the economic multiplier of all other commercial activities dependent specifically on that institution. The impact is also dependent on how correlated an institution's business is with other systemic risks.[9]

Too Big To Fail: The traditional analysis for assessing the risk of required government intervention is the "Too Big to Fail" Test (TBTF). TBTF can be measured in terms of an institution's size relative to the national and international marketplace, market share concentration (using the Herfindahl-Hirschman Index for example), and competitive barriers to entry or how easily a product can be substituted. While there are large companies in most financial marketplace segments, the national insurance marketplace is spread among thousands of companies, and the barriers to entry in a business where capital is the primary input are relatively minor. The policies of one homeowners insurer can be relatively easily substituted for another or picked up by a state residual market provider, with limits on the underwriting fluidity primarily stemming from state-by-state regulatory impediments, such as limits on pricing and capital mobility. There are arguably either no or extremely few insurers that are TBTF in the U.S. marketplace.

Too Interconnected to Fail: A more useful systemic risk measure than a traditional TBTF test is a "Too Interconnected to Fail" (TICTF) assessment. An intuitive TICTF analysis has been at the heart of most recent federal financial emergency relief decisions. TICTF is a measure of the likelihood and amount of medium-term net negative impact to the larger economy of an institution's failure to be able to conduct its ongoing business. The impact is measured not just on the institution's products and activities but also the economic multiplier of all other commercial activities dependent specifically on that institution. It is also dependent on how correlated an institution's business is with other systemic risk.

What Does ***Beta*** Mean?

A measure of the volatility, or systematic risk, of a security or a portfo-

lio in comparison to the market as a whole. Beta is used in the capital asset pricing model (CAPM), a model that calculates the expected return of an asset based on its beta and expected market returns..

Also known as "beta coefficient".

Beta is calculated using regression analysis, and you can think of beta as the tendency of a security's returns to respond to swings in the market. A beta of 1 indicates that the security's price will move with the market. A beta of less than 1 means that the security will be less volatile than the market. A beta of greater than 1 indicates that the security's price will be more volatile than the market. For example, if a stock's beta is 1.2, it's theoretically 20% more volatile than the market.

Many utilities stocks have a beta of less than 1. Conversely, most high-tech NASDAQ-based stocks have a beta of greater than 1, offering the possibility of a higher rate of return, but also posing more risk.

Beta is the sensitivity of an investment's returns as compared to a benchmark. This benchmark is commonly the S&P 500, but Fund Manager allows you to assign any investment as the benchmark. See the Benchmark Dialog. A benchmark must be assigned before beta calculations can be made.

A beta value less than 1 indicates the investment is less volatile than the benchmark. A beta value equal to 1 means the investment's volatility is the same as the benchmark, and a beta greater than 1 means the investment is more volatile.

Risk of Single Asset{Standard Deveiation]

The concept of risk is more difficult to quantify. Statistically we can express risk in terms of standard deviation of return. For example, in case of gilt edged security or government bonds, the risk nil, since the return does not vary – it is fixed. But strictly speaking if we consider inflatin and caluculate real rate of return we find that even government bonds have some amount of risk.

For other investments like shares, business etc., the rate of return is not fixed, there may be a schedule of retun with associated probability for each rate of return. The mean of the probable returns gives the expected rate of return and the standard deviation or variance which is square of standard deviation measure of risk.S

The following illustration explains the quantification of risk in terms of standard deviation.

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Statistic that measures the tendency of data to be spread out. Accountants can make important inferences from past data with this measure. The standard deviation, denoted with S and read as *sigma*, is defined as follows:

$$\sigma = \sqrt{\frac{\Sigma(x - \bar{x})^2}{n - 1}}$$

where $\bar{x}$ is the mean.

For example, one-and-one-half years of quarterly returns for XYZ stock follow:

Time Period	x	$(x - \bar{x})$	$(x - \bar{x})^2$
1	10%	0	0
2	15	5	25
3	20	10	100
4	5	-5	25
5	-10	-20	400
6	20	10	100
	60		650

From the preceding table, note that

$$\bar{x} = 60/6 = 10\%$$

$$= \sqrt{\Sigma(x - \bar{x})^2/n - 1} = \sqrt{650/(6 - 1)} = \sqrt{130} = 11.40\%$$

The XYZ stock has returned on the average 10% over the last six quarters and the variable about its average return was 11.40%. The high standard deviation (11.40%) relative to the average return of 10% indicates that the stock is very risky.

Standard Deviation with probability Distribution

Economic Outcome	Probability	Return on Investment
Great	20%	25%
Good	40%	15%
So-So	30%	5%
Really Bad	10%	0%

Calculate the standard deviation and variance.

Economic Outcome	Return On Investment	Minus	Err - The Expected Rate Of Return	Equals	Answer	Squared	Times	Probability Of The Economic	Equals	Answer
Great	25%	-	12.5%	=	12.5	156.25	X	20%	=	31.25
Good	15%	-	12.5%	=	2.5	6.25	X	40%	=	2.5
So-So	5%	-	12.5%	=	7.5	56.25	X	30%	=	16.875
Really Bad	0%	-	12.5%	=	12.5	156.25	X	10%	=	15.625
								Total	=	66.25

- So the total is 66.25. This is called the Variance.
- The square root of 66.25 = 8.139
- So the Standard Deviation is 8.139

Exercise : 2

Consider the probability distribution for the returns on stocks **A** and **B** provided below.

State	Probability	Return on Stock A	Return onStock B
1	20%	5%	50%
2	30%	10%	30%
3	30%	15%	10%
4	20%	20% -	10%

The expected returns on stocks **A** and **B** were calculated on the Expected Return page. The expected return on Stock A was found to be 12.5% and the expected return on Stock B was found to be 20%.

Given an asset's expected return, its variance can be calculated using the following equation:

$$Var(R) = \sigma^2 = \sum_{i=1}^{N} p_i (R_i - E[R])^2$$

Where

N = the number of states

pl = the probability of state i,

Ri = the return on the stock in state i, and

E[R] = the expected return on the stock

The standard deviation is calculated as the positive square root of the variance.

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$$SD(R) = \sigma = \sqrt{\sigma^2} = (\sigma^2)$$

Variance and Standard Deviation on Stocks A and B

Note: $E[R_A] = 12.5\%$ and $E[R_B] = 20\%$

Stock A

$$\sigma_A^2 = .20(.05 - .125)^2 + .30(.10 - .125)^2 + .20(.15 - .125)^2 + .20(.20 - .125)^2 = .00263$$

$$\sigma_A = \sqrt{.00263} = .0512 = 5.12\%$$

Stock B

$$\sigma_B^2 = .20(.50 - .20)^2 + .30(.30 - .20)^2 + .30(.10 - .20)^2 + .20(-.10 - .20)^2 = .04200$$

$$\sigma_B = \sqrt{.04200} = .2049 = 20.49\%$$

2.7 BETA

Beta, also known as the beta coefficient, is a measure of the volatility, or systematic risk, of a security or a portfolio in comparison to the market as a whole. Beta is calculated using regression analysis, and you can think of it as the tendency of an investment's return to respond to swings in the market. By definition, the market has a beta of 1 Individual security and portfolio values are measured according to how they deviate from the market.

> *Check your Progress*
> 5. What is Beta?
> 6. What is Variance?

A beta of 1.0 indicates that the investment's price will move in lock-step with the market. A beta of less than 1 indicates the investment will be less volatile than the market, and correspondingly, a beta of more than 1 indicates the investment's price will be more volatile than the market. For example, if a fund portfolio's beta is 1.2, it's theoretically 20% more volatile than the market.

Conservative investors looking to preserve capital should focus on securities and fund portfolios with low betas, whereas those investors willing to take on more risk in search of higher returns should look for high-beta investments.

2.8 HOW TO USE BETA

Investors can find the best use of the beta ratio in short-term decision-making, where price volatility is important. If you are planning to buy and sell within a short period, beta is a good measure of risk.

However, as a single predictor of risk for a long-term investor, the beta has too many flaws. Careful consideration of a company's fundamentals will give you a much better picture of the potential long-term risk.

Beta Calculations

Beta is a risk metric employed primarily in the equity markets. It measures the systematic risk of a single instrument or an entire portfolio. William Sharpe (1964) first used the notion in his landmark paper introducing the capital asset pricing model (CAPM). The name "beta" was applied later.

Beta describes the sensitivity of an instrument or portfolio to broad market movements. The stock market (represented by an index such as the S&P 500 or FT-100) is assigned a beta of 1.0. By comparison, a portfolio (or instrument) which has a beta of 0.5 will tend to participate in broad market moves, but only half as much as the market overall. A portfolio (or instrument) with a beta of 2.0 will tend to benefit or suffer from broad market moves twice as much as the market overall.

The formula for beta is

Where $\frac{cov(Z_p, Z_m)}{\sigma_m^2}$

cow (Zp,Zm) is the covariance between the portfolio (or instrument) return and the market return and

σ_m^2 is the variance of the market's return (volarility squared)

Both quantities are calculated using simple returns. Beta is generally estimated from historical price time series. For example, 60 trading days of simple returns might be used with sample estimators for covariance and variance.

It is possible to construct negative beta portfolios. Approaches include holding stocks (such as gold mining stocks) that tend to move against the market, shorting stocks, or putting on suitable options spreads.

Beta is sometimes used as a metric of a portfolio's market risk. This can be misleading because beta does not capture specific risk. Because of specific risk, a portfolio can have a low beta but still be highly volatile. Its price fluctuations will simply have a low correlation with those of the overall market.

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Year	k_j	k_j-	k_m	k_m-	P		
1	20	0	10	0	0.1	0	0
2	50	30	30	20	0.1	60	40
3	−50	−70	−30	−40	0.1	280	160
4	−10	−30	−10	−20	0.1	60	40
5	90	70	50	40	0.1	280	160
6	20	0	10	0	0.1	0	0
7	−10	−30	10	0	0.1	0	0
8	20	0	10	0	0.1	0	0
9	20	0	−10	−20	0.1	0	40
10	50	30	30	20	0.1	60	40
					1.0	740	480

What do these figures of ? and ɣ imply? When we say that the security has a ? of 1.54 we mean that if the return on the market portfolio rises by 10%, the return on the security j' will rise by 15.4%. An ɣ of 4.6% implies that the security earns 4.6% over and above the market rate of return.

$$\bar{k}_j = 20$$

$$\bar{k}_m = 10$$

$$\beta_j = \frac{Cov(k_j, k_m)}{Var(k_m)} = \frac{\Sigma P(k_j - \bar{k}_j)(k_m - \bar{k}_m)}{\Sigma P(k_m - \bar{k}_m)^2}$$

$$= \frac{740}{480} = 1.54$$

$$\alpha = \bar{k}_j - \beta_j \bar{k}_m$$

$$= 20 - (1.54 \times 10) = 4.6\%$$

Portfolio Variance and Standard Deviation

The variance/standard deviation of a portfolio reflects not only the variance/standard deviation of the stocks that make up the portfolio but also how the returns on the stocks which comprise the portfolio vary together. Two measures of how the returns on a pair of stocks vary together are the covariance and the correlation coefficient.

The **Covariance** between the returns on two stocks can be calculated using the following equation:

$$Cov(R_1, R_2) = \sigma_{12} = \sum_{i=1}^{N} p_i (R_{1i} - E[R_1])(R_{2i} - E[R_2])$$

where

- σ_{12} = the covariance between the returns on stocks 1 and 2,
- N = the number of states,
- p_i = the probability of state i,
- R_{1i} = the return on stock 1 in state i,
- $E[R_1]$ = the expected return on stock 1,
- R_{2i} = the return on stock 2 in state i, and
- $E[R_2]$ = the expected return on stock 2.

The **Correlation Coefficient** between the returns on two stocks can be calculated using the following equation:

$$\text{Corr}(R_1, R_2) = \rho_{12} = \frac{\sigma_{12}}{\sigma_1 \sigma_2} = \frac{\text{Cov}(R_1, R_2)}{\text{SD}(R_1)\text{SD}(R_2)}$$

where

- ρ_{12} = the correlation coefficient between the returns on stocks 1 and 2,
- σ_{12} = the covariance between the returns on stocks 1 and 2,
- σ_1 = the standard deviation on stock 1, and
- σ_2 = the standard deviation on stock 2.

Covariance and Correlation Coefficent between the Returns on Stocks A and B
Note: $E[R_A] = 12.5\%$, $E[R_B] = 20\%$, $\sigma_A = 5.12\%$, and $\sigma_B = 20.49\%$.
$\sigma_{AB} = .2(.05 - .125)(.5 - .2) + .3(.1 - .125)(.3 - .2) + .2(.15 - .125)(.1 - .2) + .2(.2 - .125)(.1 - .2)$
$\sigma_{AB} = -.0105$
$\rho_{AB} = \frac{-.0105}{(.0512)(.2049)} =$ [illegible]

Using either the correlation coefficient or the covariance, the **Variance on a Two-Asset Portfolio** can be calculated as follows:

$$\sigma_p^2 = (w_1)^2 \sigma_1^2 + (1 - w_1)^2 \sigma_2^2 + 2w_1(1 - w_1)\rho_{12}\sigma_1\sigma_2$$
$$= (w_1)^2 \sigma_1^2 + (1 - w_1)^2 \sigma_2^2 + 2w_1(1 - w_1)\sigma_{12}$$

The standard deviation on the portfolio equals the positive square root of the variance.

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Variance and Standard Deviation on a Portfolio of Stocks A and B ::Note: E [R_A] = 12.5%. E [R_B] = 20%. ? $_A$ = 5.12%. ? $_B$ = 20.49%. and ? $_{AB}$ = -1.

:Note: E [R_A] = 12.5%. E [R_B] = 20%. ? $_A$ = 5.12%. ? $_B$ = 20.49%. and ? $_{AB}$ = -1.

Note: E [R_A] = 12.5%. E [R_B] = 20%. ? $_A$ = 5.12%. ? $_B$ = 20.49%. and ? $_{AB}$ = -1.

Portfolio consisting of 50% Stock A and 50% Stock B

$$\sigma_P^2 = (.5)^2(.0512)^2 + (1-.5)^2(.2049)^2 + 2(.5)(1-.5)(-1)(.0512)(.2049) = .00591$$

$$\sigma_P = \sqrt{.00591} = .0768 = 7.68\%$$

Portfolio consisting of 75% Stock A and 25% Stock B

$$\sigma_P^2 = (.75)^2(.0512)^2 + (1-.75)^2(.2049)^2 + 2(.75)(1-.75)(-1)(.0512)(.2049) = .00016$$

$$\sigma_P = \sqrt{.00016} = .0128 = 1.28\%$$

Notice that the portfolio formed by investing 75% in Stock A and 25% in Stock B has a lower variance and standard deviation than either Stocks A or B and the portfolio has a higher expected return than Stock A. This is the essence of Diversification. by forming portfolios some of the risk inherent in the individual stocks can be eliminated.

BETA FINANCE

BETA FINANCE CALCULATION AND FORMULA | DEFINITION

Beta is a measure of the systematic, non-diversifiable risk of an investment. The beta coefficient of a security, fund, or portfolio represents its market sensitivity, relative to a given market index and time period. The S&P 500 is commonly used as a market index for such calculations.

Beta is a statistical estimate of the expected average change in an investment's rate of return that corresponds to a one percent change in the market over the time period selected.

A beta value of 0.0 indicates that the investment is risk-free or independent of the market. T-bills are often used as examples of risk-free investments. A value of 0.5 indicates that the security, fund, or portfolio is expected to be only half as risky or sensitive as the average for the market. A value of 1.0 indicates that the investment has the same risk or response as the market, as defined by a market index, such as the S&P 500 or the Russell 3000®. A value of 2.0 indicates that it is expected to be twice as risky or sensitive as the market.

In Russell Style Classification (RSC), beta is calculated as follows:

$$\beta = \frac{\sum (x - \bar{x})(y - \bar{y})}{\sum (x - \bar{x})^2}$$

Where	Equals
b	Beta
$\bar{x}$	Benchmark return
$\bar{y}$	Portfolio return

In Russell Performance Universes (RPU), beta is calculated as follows

$$\beta = \frac{n\sum R_{xi}R_{yi} - \sum R_{xi}\sum R_{yi}}{n\sum (R_{xi})^2 - (\sum R_{xi})^2}$$

Where	Equals
β	Beta
n	Number of observations
Rxi	Market excess return (market proxy return minus risk-free proxy return)
Ryi	Portfolio's excess return (portfolio return minus risk-free proxy return)

Beta

nNumber of observationsRxiMarket excess return(market proxy return minus risk-free proxy return)RyiPortfolio's excess return (portfolio return minus risk-free proxy return)For over 1,000 additional terms and definitions please see our *<u>Investment Glossary Guid</u>***Beta Calculated** *The number is calculated* for you (thank goodness) using regression analysis. The whole market, which for this purpose is considered the S&P 500, is assigned a beta of 1. There is no single index used to calculate beta, although the S&P 500 is probably the most common proxy for the market as a whole. Stocks that have a beta greater than 1 have greater price volatility than the overall market and are more risky. Stocks with a beta of 1 fluctuate in price at the same rate as the market. Stocks with a beta of less than 1 have less price volatility than the market and are less risky.

Beta and Risk

Of course, there is more to it than that. Risk also implies return. Stocks with a high beta should have a higher return than the market. If you are accepting more risk, you should expect more reward.

For example, if the market with a beta of 1 is expected to return 8%, a stock with a beta of 1.5 should return 12%. If you don't see that level of return, then the stock is not a good investment possibility. Stocks with a beta below 1 may be a safer investment (at least by this one measure) and you should expect a lower return. Beta seems to be a great way to measure the risk of any stock. If you look a young, technology stocks, they will always carry high betas. Many utilities on the other hand, carry betas below

Finding Betas

You can also compare a stock's beta to its sector to get a picture of whether the stock is out of line with its peers. You can find a stock's beta through a number of online services such as offered by Reuters. You have to register (it's free) to get to the level of detail where you can find a stock's beta among the listed ratios.

2.9 PROBLEMS WITH BETA

While the may seem to be a good measure of risk, there are some problems with relying on beta scores alone for determining the risk of an investment.

- Beta looks backward and history is not always an accurate predictor of the future.
- Beta also doesn't account for changes that are in the works, such as new lines of business or industry shifts.
- Beta suggests a stock's price volatility relative to the whole market, but that volatility can be upward as well as downward movement. In a sustained advancing market, a stock that is outperforming the whole market would have a beta greater than

2.10 HOW DO DIFFERENT TYPES OF RISK INFLUENCE A PORTFOLIO?

Essentially, in investment types of risk can be described as the uncertainty of future returns. Since share and stock prices move up and down, potentially changing all day every day, this uncertainty can be very real. The movement of prices, known as volatility, is caused by one or both of two factors. These are:

> Market risk and Investment specific risk

Market Risk cannot be avoided and has an effect on an entire investment market. It is also known as Systematic Risk. In recent years, this type of risk seems to hit most if not all major stock exchange indices at the same time. In this connected world, very little appears to be safe.

Some things are likely to cause this market risk. For example, there may be significant changes in a national economy. This may and often does take the form of changes to interest rates, inflation or unemployment predictions, GDP growth and so on. Other factors might include changes to taxation rules made by a government.

Obviously, the private investor can only avoid such perils by remaining out of each and every market! It could be said that broadly, all companies have a similar exposure to systematic risk.

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Some things are likely to cause this market risk. For example, there may be significant changes in a national economy. This may and often does take the form of changes to interest rates, inflation or unemployment predictions, GDP growth and so on. Other factors might include changes to taxation rules made by a government.

Obviously, the private investor can only avoid such perils by remaining out of each and every market! It could be said that broadly, all companies have a similar exposure to systematic risk.

Investment Specific Risk

This is specific to a company or industry. It is also known as Unsystematic Risk. The factors which cause this are generally not connected to political or national economic factors. Examples of factors which might include Investment specific risk are:

- New competitors entering a market,
- Technological improvements which render existing products or business processes obsolete, or
- Changes to the credit rating (and therefore borrowing costs) of a company

These are types of risk that can be reduced or limited by holding a diversified portfolio. This is possible because different companies will be impacted by the same changes in different ways.

NOTES

An investor may hold positions in companies that will deliberately move in opposing directions at news of the same events to lower the risk and price volatility in a portfolio. However, should all assets move in broadly the same direction at the same time, this offsetting would not work.

Case Study : Measures of Risk - Variance and Standard Deviation

Risk reflects the chance that the actual return on an investment may be very different than the expected return. One way to measure risk is to calculate the variance and standard deviation of the distribution of returns.

Consider the probability distribution for the returns on stocks A and B provided below.

State	Probability	Return onStock A	Return onStock B
1	20%	5%	50%
2	30%	10%	30%
3	30%	15%	10%
4	20%	20%	-10%

The expected returns on stocks A and B were calculated on the Expected Return page. The expected return on Stock A was found to be 12.5% and the expected return on Stock B was found to be 20%.

Given an asset's expected return, its variance can be calculated using the following equation:

$$Var(R) = \sigma^2 = \sum_{i=1}^{N} p_i (R_i - E[R])^2$$

where

- N = the number of states,
- p_i = the probability of state i,
- R_i = the return on the stock in state i, and
- E[R] = the expected return on the stock.

The standard deviation is calculated as the positive square root of the variance.

$$SD(R) = \sigma = \sqrt{\sigma^2} = (\sigma^2)^{\frac{1}{2}}$$

NOTES

Variance and Standard Deviation on Stocks A and B

Note: $E[R_A] = 12.5\%$ and $E[R_B] = 20\%$

Stock A

$$\sigma_A^2 = .20(.15 - .125)^2 + .30(.10 - .125)^2 + .20(.15 - .125)^2 + .20(.20 - .125)^2 = .00263$$

$$\sigma_A = \sqrt{.00263} = .0512 = 5.12\%$$

Stock B

$$\sigma_B^2 = .20(.50 - .20)^2 + .30(.30 - .20)^2 + .30(.10 - .20)^2 + .20(-.10 - .20)^2 = .04200$$

$$\sigma_B = \sqrt{.04200} = .2049 = 20.49\%$$

2.11 SUMMARY

Alpha, beta, and R-squared are components of Modern Portfolio Theory (MPT), which is a standard financial and academic method for assessing the risk of a fund, relative to a benchmark. A mutual fund's alpha and beta are calculated in relation to a market index. Each fund is linked to an appropriate index based on its investment category.

- Alpha: A measure of selection risk (also known as residual risk) of a mutual fund in relation to the market. A positive alpha is the extra return awarded to the investor for taking a risk, instead of accepting the market return. For example, an alpha of 0.4 means the fund outperformed the market-based return estimate by 0.4%. An alpha of -0.6 means a fund's monthly return was 0.6% less than would have been predicted from the change in the market alone.

  Beta: The measure of a fund's or stock's risk in relation to the market. A beta of 0.7 means the fund's total return is likely to move up or down 70% of the market change; 1.3 means total return is likely to move up or down 30% more than the market. Beta is referred to as an index of the systematic risk due to general market conditions that cannot be diversified away.

  R-Squared: R-squared ranges from 0 to 100 and reflects the percentage of a fund's movements that are explained by movements in its benchmark index. An R-squared of 100 means that all movements of a fund are completely explained by movements in the index.

Conversely, a low R-squared indicates that very few of the fund's movements are explained by movements in its benchmark index. Thus, R-squared can be used to determine the significance of a particular beta or alpha (the higher the R-squared, the more significant alpha and beta).

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- Standard Deviation: Standard deviation is a statistical measure of the range of a fund's performance, and is reported as an annual number. When a fund has a high standard deviation, its range of performance has been very wide, indicating that there is a greater potential for volatility.

  (Approximately 68.3% of the time (2 of 3 occurrences), the total returns of any given fund are expected to differ from its mean total return by no more than plus or minus the standard deviation figure. About 95.4% of the time (19 of 20 occurrences), a fund's total returns should be within a range of plus or minus two times the standard deviation from its mean.)

- Sharpe Ratio: A measure of a fund's excess return relative to the total variability of the fund's holdings. The higher the Sharpe ratio, the better the fund's historical risk-adjusted performance.

- Treynor Ratio: A measure of the excess return per unit of risk, where excess return is defined as the difference between the portfolio's return and the risk-free rate of return over the same evaluation period and where the unit of risk is the portfolio's beta.

Morningstar Risk

The fund's performance is examined for the past 36 months. Any months in which the portfolio's returns were less than those of the 90-day Treasury bill are flagged.

Morningstar then adds up the amounts by which the fund trailed the T-bill return and divides the figure by 36, to generate an average monthly underperformance.

Morningstar does the same for the rating group as a whole, and divides the fund's underperformance by the group's underperformance to arrive at a Morningstar Risk score.

To assign ratings, Morningstar subtracts each fund's Morningstar Risk score from its Morningstar Return score. The funds in each rating group are then ranked by this raw number, from highest to lowest. The top 10% of funds receive 5 stars, the next 22.5% receive 4 stars, the middle 35% receive 3 stars, the next 22.5% receive 2 stars, and the bottom 10% receive 1 star. (There is no "zero" star rating—funds with less than 36 months of return data are simply not rated.)

2.12 ANSWERS TO CHECK YOUR PROGRESS

1. Risk is the potential for realizing low returns or even losing money,

possibly preventing you from meeting important objectives.

2. Systematic Risks and Unsystematic Risks.
3. Systematic risk refers to that portion of total variability in return caused by factors affecting the prices of all securities. Economic, political, and sociological changes are sources of systematic risk.
4. Unsystematic risk is the portion of total risk that is unique or peculiar to a firm or an industry, above and beyond that affecting securites markets in general.
5. A measure of the volatility, or systematic risk, of a security or a portfolio in comparison to the market as a whole
6. The variance/standard deviation of a portfolio reflects not only the variance/standard deviation of the stocks that make up the portfolio but also how the returns on the stocks which comprise the portfolio vary together

2.13 REVIEW QUESTIONS?

1. What is unsystematic risk? Explain different types of unsystematic risk.
2. Write a notes on:
   a) Interest rate risk
   b) Market risk
   c) Purchasing power risk
3. What is beta? How is it interpreted?
4. Explain the concept of systematic risk. Why is it called systematic risk?
5. What are the sources of risk in an investment? Explain and elucidate.

2.14 REFERENCES

1. INVESTMENT MANAGEMENT – Theory and Practice – Sultan chand and Sons.
2. FUNDAMENTALS OF FINANCIAL MANAGEMENT – Ramesh K.S. Rao – Macmillan
3. PORTFOLIO MANAGEMENT – S. Kevin
4. SECURITY ANALYUSIS AND PORTFOLIO MANAGEMENT - S. Kevin
5. SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT – M. Renganatham and R. Madhumathi

NOTES

RETURN

UNIT STRUCTURE

3.1 INTRODUCTION
3.2 RETURN ANALYSIS
3.3 THE COMPONENTS OF RETURN
3.4 MEASURING THE RATE OF RETURN
3.5 PROBABILITY DISTRIBUTION
3.6 QUESTIONS
3.7 CASES
3.8 SUMMARY
3.9 ANSWERS TO CHECK YOUR PROGRESS
3.10 REVIEW QUESTIONS
3.11 REFERENCES

UNIT OBJECTIVES

To calculate the total return and return relative and cumulative wealth index Compute the expected return(ex-ante) and actual return (ex-post) Measurement of Holding Period Yield, Yield to maturity and return with probability Measurement of expected (ex ante) return and risk of a security

3.1 INTRODUCTION

When an asset is bought, the gain (or loss) from that investment is called the return on investment. It is the major factor that motivates an investor to invest in an asset. ssessing the return of an asset is important because of the following reasons: It facilitates comparison between various alternatives. It helps in analyzing the past performance.It helps in forecasting the future returns.

Return expresses the amount which an investor actually earned on an investment during a certain period. Return includes the interest, dividend and capital gains; while risk represents the uncertainty associated with a particular task. In financial terms, risk is the chance or probability that a certain investment may or may not deliver the actual/expected returns.

The risk and return trade off says that the potential return rises with an increase in risk. It is important for an investor to decide on a balance between the desire for the lowest possible risk and highest possible return.

NOTES

3.2 RETURN ANALYSIS

An investment is the current commitment of funds done in the expectation of earning greater amount in future. Returns are subject to uncertainty or variance Longer the period of investment, greater will be the returns sought. An investor will also like to ensure that the returns are greater than the rate of inflation.

An investor will look forward to getting compensated by way of an expected return based on 3 factors -

- Risk involved
- Duration of investment [Time value of money]
- Expected price levels [Inflation]

The basic rate or time value of money is the real risk free rate [RRFR] which is free of any risk premium and inflation. This rate generally remains stable; but in the long run there could be gradual changes in the RRFR depending upon factors such as consumption trends, economic growth and openness of the economy.

If we include the component of inflation into the RRFR without the risk premium, such a return will be known as nominal risk free rate [NRFR]

NRFR = (1 + RRFR) * (1 + expected rate of inflation) - 1

Third component is the risk premium that represents all kinds of uncertainties and is calculated as follows -

Expected return = NRFR + Risk premium

Check your Progress

1. What is Return?

A] Realized Return

Yield assuming that coupon payments are invested at the going market interest rate at the time of their receipt and rolled over until the bond matures. For example, a deposit of Rs.1,000 in a bank on January 1, at a stated annual interest rate of 10% will be worth Rs.1,100 exactly a year later. The historical or realized return in this case is 10%.

B] Expected Return

Expected Return: E(R)

The expected return from investing in a security over some future holding period is an estimate of the future outcome of this security.

- Although the ***Expected Return*** is an estimate of an investor's expectations of the future, it can be estimated using either ***ex ante*** (forward looking) or ***ex post*** (historical) data.

- If the expected return is equal to or greater than the required return, purchase the security.

NOTES

- Regardless of how the individual returns are calculated, the ***Expected Return of a Portfolio*** is the weighted sum of the individual returns from the securities making up the portfolio:

$$E(R)_P = \sum_{n=1}^{N} w_n E(R)_n$$

<u>***Ex ante expected return***</u> calculations are based on probabilities of the future states of nature and the expected return in each state of nature. Sum over all states of nature, the product of the probability of a state of nature and the return projected in that state.

State	P_s	R_s	$P_s * R_s$
Good	30%	20%	0.3(0.2)
Average	50%	15%	+0.5(0.15)
Poor	20%	-4%	+0.2(-0.04)
$E(R)=\sum_{s=1}^{S} P_s R_s$			12.70%

Check your Progress

2. What are the various components of returns?
3. What is Expected Return?

Ex post expected return calculations are based on hisorical area. Add the historical return and then divide by the number of observation.

Year	R_t
2002	15%
2003	20%
2004	9%
2005	10%
2006	5%
$E(R)=\left(\sum_{t=1}^{T} R_t\right)\div T$	11.80%

C] Required Return: Req(R)

The minimum expected rate of return that investors require before they would invest in a given security taking into consideration the investment's underlying risk.

The ***Required Rate of Return*** for security j equals the Nominal Risk-

Free Return plus the Risk Premium given the Risk(s) of security j.

$$Req(R)_j = R_{Free} + RP_j$$

The *Nominal Risk-Free Return* equals

(1 + Real Risk-Free Return)*(1 + Expected Inflation) - 1

$$R_{Free} = [1 + R_{Real}]\ [1 + E(I)] - 1$$

therefore $R_{Free} = R_{Real} + E(I) + [R_{Real} * E(I)]$

- This is called the *Fisher Equation.*
- The approximate Fisher Equation equals $R_{Free} = R_{Real} + E(I)$ where the cross-product term is dropped should only be used during periods of very low inflation.

Note: The *International Fisher Equation* is defined as:

$$\frac{(1+R_{Free,D})}{(1+R_{Free,F})} = \frac{(1+R_{Real,D})}{(1+R_{Real,F})} * \frac{[1+E(I_D)]}{[1+E(I_F)]}$$

where D = Domestic; F = Foreign

Two common methods used to calculate required returns are:

- **Security Market Line** (SML): $Req(R_i) = R_{Free} + \beta_i[E(R_M) - R_{Free}]$

Note: The SML is designed for both a single asset or portfolio.

- **Security Market Line** (SML): $Req(R_i) = R_{Free} + \beta_i[E(R_M) - R_{Free}]$

Note: The SML is designed for both a single asset or portfolio.

- **Capital Market Line** (CML): $Req(R_i) = R_{Free} + \sigma_i\left[\frac{E(R_M) - R_{Free}}{\sigma_M}\right]$

Note: The CML is designed to be used for efficient portfolios.

The objective of any investor is to maximize expected returns from his investments, subject to various constraints, primarily risk. Return is the motivating force, inspiring the investor in the form of rewards, for undertaking the investment. The importance of returns in any investment decision can be traced to the following factors:

It enables investors to compare alternative investments in terms of what they have to offer the investor.

Measurement of historical (past) returns enables the investors to assess how well they have done

NOTES

Measurement of historical returns also helps in estimation of future returns.

This reveals that there are two types of returns – Realized or Historical Return and Expected Return.

3.3 THE COMPONENTS OF RETURN

What constitutes the return on any investment? Return is basically made up of two components:

- The periodic cash receipts or income on the investment in the form of interest, dividends, etc. The term yield is often used in connection with this component of return. Yield refers to the income derived from a security in relation to its price, usually its purchase price. For example, the yield on a 10% bond at a purchase price of Rs.900 is 11.11%.
- The appreciation (depreciation) in the price of the asset, is referred to as capital gain (loss). This is the difference between the purchase price and the price at which the asset can be, or is, sold.

Many investors have capital gains as their primary objective and expect this component to be larger than the income component.

3.4 MEASURING THE RATE OF RETURN

The rate of return is the total return the investor receives during the holding period (the period when the security is owned or held by the investor) stated as a percentage of the purchase price of the investment at the beginning of the holding period. In other words, it is the income from the security in the form of cash flows and the difference in price of the security between the beginning and end of the holding period expressed as a percentage of the purchase price of the security at the beginning of the holding period.

A] Holding Period Yield

Holding Period - An investment's holding period is used for a number of different functions, including evaluating an investment's performance, calculating loss or gain from the investment and determining whether an investment is worthwhile. The holding period of an investment is also used to determine how the capital gain or loss should be taxed because long-term investments tend to be taxed at a lower rate than short-term investments.

What Does *Holding Period Return/Yield* Mean?

The total return received from holding an asset or portfolio of assets.

Holding period return/yield is calculated as the sum of all income and capital growth divided by the value at the beginning of the period being measured.

$$\text{Holding Period Return} = \frac{\text{Income} + (\text{End of Period Value} - \text{Initial Value})}{\text{Initial Value}}$$

To calculate holding period return/yield over multiple years we calculate the annualized holding period return:

$$\text{Annualized HPR} = \left(\frac{\text{Income} + (\text{End of Period Value} - \text{Initial Value})}{\text{Initial Value}}\right)^{\frac{1}{\text{Years}}} - 1$$

Holding period return is a very basic way to measure how much return you have obtained on a particular investment. This calculation is on a per-dollar-invested basis, rather than a time basis, which makes it difficult to compare returns on different investments with different time frames. When making comparisons such as this, the annualized calculation shown above should be used.

B] Annual Percentage Yield - APY

What Does *Annual Percentage Yield - APY* Mean?

The effective annual rate of return taking into account the effect of compounding interest. APY is calculated by:

$$= (1 + \text{periodic rate})^{\#\ \text{Periods}} - 1$$

The resultant percentage number assumes that funds will remain in the investment vehicle for a full 365 days.

Annual Percentage Yield - APY

The APY is similar in nature to the annual percentage rate. Its usefulness lies in its ability to standardize varying interest-rate agreements into an annualized percentage number.

For example, suppose you are considering whether to invest in a one-year zero-coupon bond that pays 6% upon maturity or a high-yield money market account that pays 0.5% per month with monthly compounding.

At first glance, the yields appear equal because 12 months multiplied by 0.5% equals 6%. However, when the effects of compounding are included by calculating the APY, we find that the second investment actually yields 6.17%, as 1.005^12-1 = 0.0617.

NOTES

C] Current Yield

Annual income (interest or dividends) divided by the current price of the security. This measure looks at the current price of a bond instead of its face value and represents the return an investor would expect if he or she purchased the bond and held it for a year. This measure is not an accurate reflection of the actual return that an investor will receive in all cases because bond and stock prices are constantly changing due to market factors.

$$\text{Current Yield} = \frac{\text{Annual Cash Inflows}}{\text{Market Price}}$$

Also referred to as "bond yield", or "dividend yield" for stocks.

For example, if a bond is priced at Rs.95.75 and has an annual coupon of Rs.5.10, the current yield of the bond is 5.33%. If the bond is a 10-year bond with nine years remaining and you were only planning to hold it for one year, you would receive the Rs.5.10, but your actual return would depend on the bond's price when you sold it. If, during this period, interest rates rose and the price of your bond fell to Rs.87.34, your actual return for the period would be -3.5% (-Rs3.31/Rs95.75) because although you gained Rs5.10 in dividends, your capital loss was Rs.8.41.

D] Yield to Maturity

The yield to maturity formula is used to calculate the yield on a bond based on its current price on the market. The yield to maturity formula looks at the effective yield of a bond based on compounding as opposed to the simple yield which is found using the dividend yield formula.

Notice that the formula shown is used to calculate the approximate yield to maturity. To calculate the actual yield to maturity requires trial and error by putting rates into the present value of a bond formula until ***P***, or Price, matches the actual price of the bond. Some financial calculators and computer programs can be used to calculate the yield to maturity.

$$Approx\ YTM = \frac{C + \frac{F-P}{n}}{\frac{F+P}{2}}$$

$C = Coupon/Interest\ Payment$

$F = Face\ Value$

$P = Price$

$n = years\ to\ maturity$

Example:

The price of a bond is Rs.920 with a face value of Rs.1000 which is the face value of many bonds. Assume that the annual coupons are Rs100. which is a 10% coupon rate, and that there are 10 years remaining until maturity. This example using the approximate formula would be

After solving this equation, the estimated yield to maturity is 11.25%.

E] Relative Return

The return that an asset achieves over a period of time compared to a benchmark. The relative return is the difference between the absolute return achieved by the asset and the return achieved by the benchmark.

Relative returns are most often used when reviewing the performance of a mutual fund manager. Because holders of mutual funds are charged management fees, they expect a manager to achieve returns higher than the benchmark index.

For example, if the fund you are holding achieves an absolute return of 12% over the past year while the benchmark index provides a return of 15%, then the fund has achieved a relative return of -3% for the year.

F] Absolute Return

The return that an asset achieves over a certain period of time. This measure looks at the appreciation or depreciation (expressed as a percentage) that an asset - usually a stock or a mutual fund - achieves over a given period of time.

Absolute return differs from relative return because it is concerned with the return of a particular asset and does not compare it to any other measure or benchmark.

G] Bench Mark

A standard against which the performance of a security, mutual fund or investment manager can be measured. Generally, broad market and market-segment stock and bond indexes are used for this purpose.

When evaluating the performance of any investment, it's important to compare it against an appropriate benchmark. In the financial field, there are dozens of indexes that analysts use to gauge the performance of any given investment including the S&P 500, the Dow Jones Industrial Average, the Russell 2000 Index and even competitor fund.

NOTES

Check your Progress

4. What is Realized Return?
5. What is probability distribution?

H] Appreciation

An increase in the value of an asset over a period of time. The increase can occur for a number of reasons including increased demand or weakening supply, or as a result of changes in inflation or interest rates. This is the opposite of depreciation, which is a decrease over time.

This term can be used to refer to an increase in any type of asset such as a stock, bond, currency or real estate. For example, the term capital appreciation refers to an increase in the value of financial assets such as stocks, which can occur for reasons such as improved financial performance of the company.

I] Real Rate of Return

The annual percentage return realized on an investment, which is adjusted for changes in prices due to inflation or other external effects. This method expresses the nominal rate of return in real terms, which keeps the purchasing power of a given level of capital constant over time.

Adjusting the nominal return to compensate for factors such as inflation allows investors to determine how much of their nominal return is actually real return.

For example, let's say your bank pays you interest of 5% per year on the funds in your savings account. If the inflation rate is currently 3% per year, then the real return on your savings today would be 2%. In other words, even though the nominal rate of return on your savings is 5%, the real rate of return is only 2%, which means that the real value of your savings only increases by 2% during a one-year period.

J] Capital Gain

An increase in the value of a capital asset (investment or real estate) that gives it a higher worth than the purchase price. The gain is not realized until the asset is sold. A capital gain may be short term (one year or less) or long term (more than one year) and must be claimed on income taxes. A capital loss is incurred when there is a decrease in the capital asset value compared to an asset's purchase price.

Profit that results when the price of a security held by a mutual fund rises above its purchase price and the security is sold (realized gain). If the security continues to be held, the gain is unrealized. A capital loss would occur when the opposite takes place.

Long-term capital gains are usually taxed at a lower rate than regular

income. This is done to encourage entrepreneurship and investment in the economy.

Tax conscious mutual fund investors should determine a mutual fund's unrealized accumulated capital gains, which are expressed as a percentage of its net assets, before investing in a fund with a significant unrealized capital gain component. This circumstance is referred to as a fund's capital gains exposure. When distributed by a fund, capital gains are a taxable obligation for the fund's investors.

3.5 PROBABILITY DISTRIBUTION

What are probabilities? A probability is a number that describes the chances of an event taking place. Probabilities are governed by five rules and range from 0 to 1.

A probability can never be larger than 1 (In other words maximum probability of an event taking place is 100%).

The sum total of probabilities must be equal to 1.

A probability can never be a negative number.

If an outcome is certain to occur, it is assigned a probability of 1, while impossible outcomes are assigned a probability of 0.

The possible outcomes must be mutually exclusive and collectively exhaustive.

How does probability affect the rate of return? In a world of uncertainty, the expected return may or may not **materialize**. In such a situation, **the expected rate of return for any asset is the weighted average rate of return using the probability of each rate of return as the weight.** The expected rate of return "k" is calculated by summing the products of the rates of return and their respective probabilities. This can be mathematically stated as follows:

Probability Distribution- The weather this weekend

Outcome	Probability
Sunny	80 %
Rain	10 %
Snow	0.00005 %
Volcanic Ash	0.00005 %

The total must equal 100%

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Probability Distribution - In Business		
Economic Outcome	Probability	Return on Investment
Great	20%	25%
Good	40%	15%
So-So	30%	5%
Really Bad	10%	0%

Really Bad 10% 0%

- Economic Outcome = What might happen next year to the country's overall economy.
- Probability = Estimate of the likelihood that the economy will be in each outcome.
- Return on Investment = Estimate of your profit in each economic outcome.

Taking a Weighted Average - Expected Rate of Return (ERR)

What is the most likely return on your investments next year? Just multiply it out and add.

Probability	Times	Outcome	Equals	Result
20%	X	25%	=	5%
40%	X	15%	=	6%
30%	X	5%	=	1.5%
10%	X	0%	=	0%
			Total	12.5%

So after taking a weighted average the Expected Rate of Return (ERR) is 12.5%

Expected Return

The future is uncertain. Investors do not know with certainty whether the economy will be growing rapidly or be in recession. As such, they do not know what rate of return their investments will yield. Therefore, they base their decisions on their expectations concerning the future.

The expected rate of return on a stock represents the mean of a probability distribution of possible future returns on the stock. The table below provides a probability distribution for the returns on stocks **A** and **B**.

NOTES

State	Probability	Return on Stock A	Return on Stock B
1	20%	5%	50%
2	30%	10%	30%
3	30%	15%	10%
3	20%	20%	-10%

In this probability distribution, there are four possible states of the world one period into the future. For example, state 1 may correspond to a recession. A probability is assigned to each state. The probability reflects how likely it is that the state will ocurr. The sum of the probabilities must equal 100%, indicating that something must happen. The last two columns present the returns or outcomes for stocks **A** and **B** that will occur in the four states.

Given a probability distribution of returns, the expected return can be calculated using the following equation:

$$E[R] = \sum_{i=1}^{N} p_i R_i$$

where

- $E[R]$ = the expected return on the stock,
- N = the number of states,
- p_i = the probability of state i, and
- R_i = the return on the stock in state i.

Expected Return on Stocks A and B

Stock A

$$E[R_A] = .20(5\%) + .30(10\%) + .30(15\%) + .25(20\%) = 12.5\%$$

Stock B

$$E[R_B] = .20(50\%) + .30(30\%) + .30(10\%) + .25(-10\%) = 20\%$$

So we see that **Stock B** offers a higher expected return than **Stock A**. However, that is only part of the story; we haven't yet considered risk.

3.6 QUESTIONS

NOTES

Expected Return Quiz: Results

See the information below to answer the following questions.

State	Probability	Return on Stock A	Return on Stock B
1	12%	-12%	46%
2	70%	-35%	-40%
3	6%	24%	41%
4	12%	43%	1%

1	Find the Expected Return on Stock A.
	a. -19.83%
	b. -19.34%
	c. -18.25%
	d. -17.32%
Correct Answer:	b
Explanation	The Expected Return on Stock A is calculated as follows: $E[R_A] = 0.12(-12\%) - 0.7(-35\%) - 0.06(24\%) - 0.12(43\%) = -19.34\%$

2	Find the Variance of the returns on Stock A.
	a. 0.0757
	b. 0.1286
	c. 0.2328
	d. 0.31
Correct Answer:	a
Explanation	The Variance on Stock A is calculated as follows: *Using the Expected Return on Stock A from the previous problem* $\sigma^2_A = 0.12(-0.12 - -0.1934)^2 - 0.7(-0.35 - -0.1934)^2 - 0.06(0.24 - -0.1934)^2 - 0.12(0.43 - -0.1934)^2 = 0.0757$

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3	Find the Standard Deviation of the returns on Stock A.
	a. 26.75%
	b. 27.52%
	c. 28.35%
	d. 29.23%
Correct Answer:	b
Explanation:	The **Standard Deviation on Stock A** is calculated as the square root of the Variance. *Using the Variance on Stock A from the previous problem* ? $_A$ = $(0.0757)^{1/2}$ = 0.2752 = 27.52%

5.	Find the Variance of the returns on Stock B.
	a. 0.1079
	b. 0.1651
	c. 0.2616
	d. 0.3273
Correct Answer:	a
Explanation:	The **Variance on Stock B** is calculated as follows: *Using the Expected Return on Stock B from the previous problem* ? ^2_B = $0.12(0.46 - -0.199)^2 + 0.7(-0.4 - -0.199)^2 + 0.06(0.41 - -0.199)^2 + 0.12(0.01 - -0.199)^2$ = 0.1079

6.	Find the Standard Deviation of the returns on Stock B.
	a. 32.85%
	b. 33.73%
	c. 34.81%
	d. 35.67%
Correct Answer:	a
Explanation:	The **Standard Deviation on Stock B** is calculated as the square root of the Variance. *Using the Variance on Stock B from the previous problem* ? $_B$ = $(0.1079)^{1/2}$ = 0.3285 = 32.85%

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7.	Find the Covariance between the returns on Stock A and Stock B
	a. 0.0049
	b. 0.0593
	c. 0.1633
	d. 0.2602
Correct Answer:	b
Explanation:	The **Covariance** is calculated as follows: *Using information from the above problems.* ? AB = 0.12(-0.12 - -0.1934)(0.46 - -0.199) + 0.7(-0.35 - -0.1934)(-0.4 - -0.199) + 0.06(0.24 - -0.1934)(0.41 - -0.199) + 0.12(0.43 - -0.1934)(0.01 - -0.199) = 0.0593

8.	Find the Correlation Coefficient between the returns on Stock A and Stock B.
	a. 0.644
	b. 0.656
	c. 0.685
	d. 0.702
Correct Answer:	b
Explanation:	The **Correlation Coefficient** is calculated as follows: *Using information from the above problems.* $? AB = \frac{0.0593}{(0.2752)(0.3285)} = 0.656$

3.7 CASES

Measuring Historical Return

The total return on an investment for a given period is:

Total return = Cash payment received during the period + Price change over the period / Price of the investment at the beginning

All items are measured in rupees. The rupee cash payment received during the period may be positive or zero. The rupee price change over the period is simply the difference between the ending price and the beginning price. This can be positive (ending price exceeds the beginning price) or zero (ending price equals the beginning price) or negative (ending price is less the beginning price)

$$R = C + (PE+PB) / PB$$

Where R = total return over the period

C = Cash payment received during the period

PE = ending price of the investment

PB = beginning price

To illustrate consider the following information for an equity stock:

1) Price at the beginning of the year : Rs 60.00
2) Dividend paid at the end of the year: Rs 2.40
3) Price at the end of the year: Rs 69:00

The total return on this stock is calculated as follows:

2.40 + (69.00 – 60.00) / 60.00 = 0.19 p or 19 percent

It is helpful to split the total return into two components viz. current return and capital return as follows:

Cash payment + Ending price — beginning price

The total return of 19 percent in our example may be broken down as follows:

2.40 / 60.00 + 69.00 – 60.00 / 60.00

= 4 percent / Current return + 5 percent / capital return

Thus, the total return concept is all inclusive (as it includes the current yield as well as the price change) and measures the total return per rupee of original investment. Hence it can be used for comparing investment returns over a specified period.

Return Relative:

Often it is necessary to measure returns in a lightly different manner. This is particularly true when a cumulative wealth index or a geometric mean has to be calculated, because in such calculations negative returns cannot be used. The concept of return relative is used in such cases. The return relative is defined as:

Return relative = C + PE / PB

Put differently

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Return relative = 1 + Total return

In our example the return relative is: 1 + 0.19 = 1.19.

Note that even though the total return may be negative; the return relative cannot be negative. At worst it is zero.

Cumulative Wealth Index:

A return measure like total return reflects changes in the level of wealth. For some purposes it is more useful to measure the level of wealth (or price) rather than the change in the level of wealth. To do this, we must measure the cumulative effect of returns over time, given some stated init7ial amount, which is typically one rupee.

The cumulative wealth index captures cumulative effect of total returns. It is calculated as follows:

CWIn = WI0 (1 + R1) (1 + R2) .... (1 + Rn)

CWIn = cumulative wealth index at the end of n years

WI0 = the beginning index value which is typically one rupee

Ri = total return for year i (i= 1,....n)

To illustrate consider a stock which earns the following returns over a five year period: R1 = 0.14, R2 = 0.12, R3 = — 0.08, R4 = 0.25, and R5 =0.02

The cumulative wealth index at the need of the five year period, assuming a beginning index value of one rupee is:

CWI5 = 1 (1.14) (1.12) (0.92) (1.25) (1.02) = 1.498

Thus, one rupee invested at the beginning of year would be worth Re 1.498 at the end of year 5.

You can use the values for the cumulative index to obtain the total return for a given period, using the following equation:

R n = CWIn / CWI n – 1 – 1

Where

Rn = total return for period n

CWI = cumulative wealth index

Probability Distribution

The probability distributions and corresponding rates of return for Dove Company Limited are shown below.

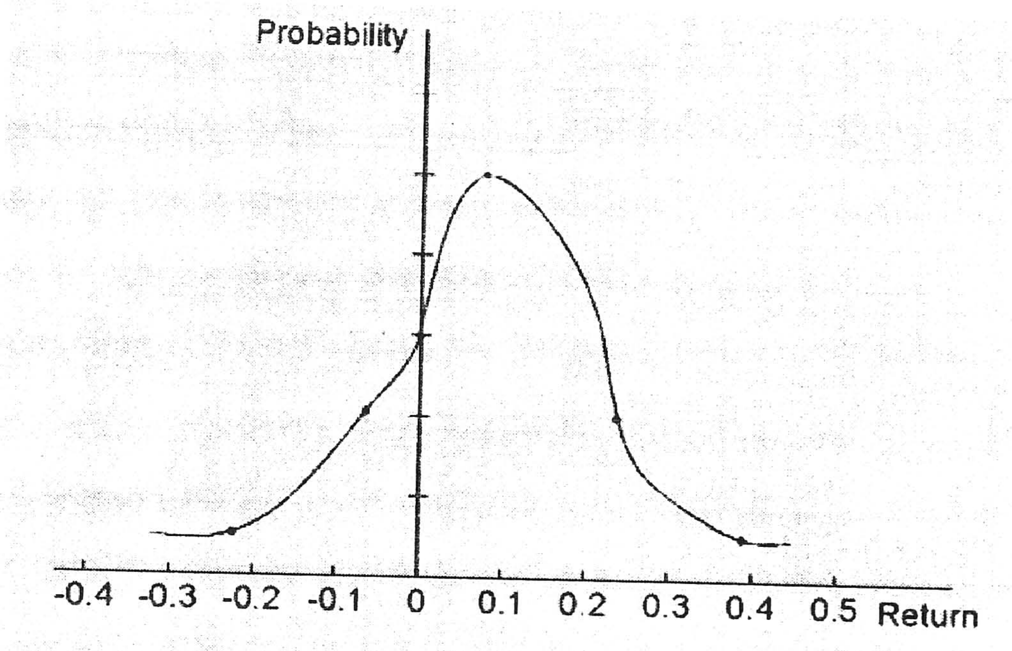
Possible Outcomes (i)	Probability of Occurrence (P_i)	Rate of Return (%) (K_i)
1	0.10	50
2	0.20	30
3	0.40	10
4	0.20	-10
	0.10	-30
	1.00	

$$E[R] = \sum_{i=1}^{N} p_i R_i$$

$$= (0.10)\ (0.50) + (0.20)\ (0.30) + (0.40)\ (0.10) + (0.20)\ (-\ 0.10) + (0.10)\ (-\ 0.30)$$

$$= 0.05 + 0.06 + 0.04 - 0.02 - 0.03 = 0.1$$

$$= 10\%$$



3.8 SUMMARY

Return expresses the amount which an investor actually earned on an investment during a certain period. Return includes the interest, dividend and capital gains; while risk represents the uncertainty associated with a particular task. In financial terms, risk is the chance or probability that a certain investment may or may not deliver the actual/expected returns. The risk and return trade off says that the potential return rises with an increase in risk. It is important

for an investor to decide on a balance between the desire for the lowest possible risk and highest possible return.

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3.9 ANSWERS TO CHECK YOUR PROGRESS

1. Return expresses the amount which an investor actually earned on an investment during a certain period. Return includes the interest, dividend and capital gains; while risk represents the uncertainty associated with a particular task. In financial terms, risk is the chance or probability that a certain investment may or may not deliver the actual/expected returns.
2. Expected Return, Realized Return and required rate of return.
3. The expected return from investing in a security over some future holding period is an estimate of the future outcome of this security.
4. Yield assuming that coupon payments are invested at the going market interest rate at the time of their receipt and rolled over until the bond matures.
5. A probability is a number that describes the chances of an event taking place. Probabilities are governed by five rules and range from 0 to 1.

3.10 REVIEW QUESTIONS

1. Explain the relationship between risk and return.
2. Explain various types of risk
3. Explain various techniques of measurement of return
4. State the components of return.
5. Distinguish ex-ante and ex-post return.

3.11 REFERENCES

1. INVESTMENT MANAGEMENT – Theory and Practice – Sultan chand and Sons.
2. FUNDAMENTALS OF FINANCIAL MANAGEMENT – Ramesh K.S. Rao – Macmillan
3. PORTFOLIO MANAGEMENT – S. Kevin
4.. SECURITY ANALYUSIS AND PORTFOLIO MANAGEMENT - S. Kevin
5.. SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT – M. Renganatham and R. Madhumathi
6. WWW.RISKGLOSSORY.COM

FUNDAMENTAL ANALYSIS

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UNIT STRUCTURE

4.1 Meaning

4.2 Two Analytical Models

4.3 Components Of Fundamental Analysis

4.4 Answers to Check your Progress

4.5 Review Questions

4.6 References

UNIT OBJECTIVES

1. to conduct a company stock valuation and predict its probable price evolution,
2. to make a projection on its business performance,
3. to evaluate its management and make internal business decisions,
4. to calculate its credit risk.

Check your Progress

1. What is Fundamental Analysis?

4.1 MEANING

Fundamental analysis of a business involves analyzing its financial statements and health, its management and competitive advantages, and its competitors and markets. When applied to futures and forex, it focuses on the overall state of the economy, interest rates, production, earnings, and management. When analyzing a stock, futures contract, or currency using fundamental analysis there are two basic approaches one can use; bottom up analysis and top down analysis. The term is used to distinguish such analysis from other types of investment analysis, such as quantitative analysis and technical analysis.

Fundamental analysis is performed on historical and present data, but with the goal of making financial forecasts.

4.2 TWO ANALYTICAL MODELS

When the objective of the analysis is to determine what stock to buy and at what price, there are two basic methodologies

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1. Fundamental analysis maintains that markets may misprice a security in the short run but that the "correct" price will eventually be reached. Profits can be made by trading the mispriced security and then waiting for the market to recognize its "mistake" and reprice the security.
2. Technical analysis maintains that all information is reflected already in the stock price. Trends 'are your friend' and sentiment changes predate and predict trend changes. Investors' emotional responses to price movements lead to recognizable price chart patterns. Technical analysis does not care what the 'value' of a stock is. Their price predictions are only extrapolations from historical price patterns.

Investors can use any or all of these different but somewhat complementary methods for stock picking. For example many fundamental investors use technical for deciding entry and exit points. Many technical investors use fundamentals to limit their universe of possible stock to 'good' companies.

4.3 COMPONENTS OF FUNDAMENTAL ANALYSIS

1. Economic analysis
2. Industry analysis
3. Company analysis

On the basis of these three analyses the intrinsic value of the shares are determined. This is considered as the true value of the share. If the intrinsic value is higher than the market price it is recommended to buy the share . If it is equal to market price hold the share and if it is less than the market price sell the shares.

The steps involved in fundamental analysis are:

1. Macroeconomic analysis, which involves considering currencies, commodities and indices.
2. Industry sector analysis, which involves the analysis of companies that are a part of the sector.
3. Situational analysis of a company.
4. Financial analysis of the company.
5. Valuation

A Three-Phase Analysis

A fundamental analyst looks the general economic situation, makes an evaluation an industry and finally analysis his investing company.

4.3.1. ECONOMIC ANALYSIS

a) The stock market is an integral part of the total economy of a country more so in a free economy like that of the country USA and to some extend in a mixed economy like India. After 1990 India is marching forward with its new liberalised economic policy. New economic policy shape is as below.

1. Liberalization.
2. Modernization.
3. Globalization.
4. Extension of Privatizing.
5. Structural Reforms.
6. Financial Reforms.

b) We can simply point out the growth before and after the liberalization. Before 1990 there was a licensing policy and the government will issue license for starting industries based on demand in the country. At that time an average of 200 companies rise every year. After new economic policy every year around 1000 companies started in first 5 years. In 1990 Bombay Stock Exchange had a listing of 1200 companies. But in 1996 total-listing companies of the exchange raised more than 6000 companies for trading. What a tremendous growth in recent 6 years? It is a historical record of the century and one cannot forget even in the next century.

c) Even though a closed economy will suit to an under developed country, we can get the real growth in the open economy only.

d) Free market economies go through a continuous cyclical process of change; boom, recession, slump and recovery. This cyclical movement is an inevitable self-correcting mechanism of any free-market economy. As India moves away from a failed centrally planned economic system called as socialism to a more promising market oriented economic system called as capitalism, the impact of these business cycles will be more pronounced in the years to come.

e) The economic cycles affect the new companies, turnaround companies and very small companies in different ways. If a corporate turnaround is in progress when the economy is also recovering and booming, the corporate revival will be faster and stronger. On the other hand, if the economy is in the grip of severe recession when the co-operate turnaround is launched, the entire recovery process will slow down and in some cases even reversed.

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Many industry watchers observe that one of the major reasons which helped the ailing Chrysler Corporation recover remarkably under the dynamic leadership of Lee Lacocca during 1980, was the unprecedented economic boom in the U S A under the Reagon Administration (1980-88).

f) In our country the L C V (Light Commercial Vehicles) industry, which showed clear signals of a possible turnaround in its fortunes during 1990-91. But the economic down turn which followed two years of credit squeeze, high interest cost, rupee devaluation, import compression, reduced government spending severely adversely affected the recovery process of the three major L C V manufactures like D C M Toyota, Swaraj Mazda, Eicher Motor and Alwyn Nissan (Mahindra Nissan).

g) The fortunes of the shipping industry are linked with international trade, which in turn go hand in hand with global economic cycles. Export-oriented companies are also affected when global economy slumps. Agro based industries like solvent extraction are closely linked with monsoon.

h) Every one analyses whether the stock market is going through a bull phase or a bear phase. At the peak of a bull phase, even sick and closed companies are likely to attract the attention of the investors. The bull market ignores fundamentals and goes high. In bear market panic bear cycles discount the strong fundamentals. Even blue chips are neglected in bear market. The stock market cannot flourish in the bad economic situation. The other major aspects of economic analysis are

A] Monsoon

Early favourable monsoon is good for stock market. In good monsoon the country's G D P (Gross Domestic Production) increases. As peoples purchasing power goes up the aggregate demands will go up companies do well; their profits go up and investors get higher yielding. The impact of monsoon is more pronounced on agro industries, fertilisers, pesticides, seeds, and edible oil. Subsequently the demands for other manufacturers goods also go up.

B] War

A war between two countries will have a negative impact in money value, profits, and stock markets. A war between India and Pakistan will have negative impact on both countries. If a war occurred between India and China then it is a total disastrous. Every war is a destructive one and economically wasteful. In the year 1999 Kargil border dispute, India lost some thousand crores of money. Post war inflation will be high. Taxes will go high to make

up government expenditure. The purchasing power of people will come down lower and aggregate demand declines so company profits will become low. Investor's losses will be heavy. The recent Gulf War towards Kuwait Rescue from Iraq proved that such external conflicts could also have disastrous economic consequences for India, even though we have not participated in the war. High petroleum prices eroded our money.

C) Inflation

We have discussed about inflation in a separate chapter. Inflation erodes the purchasing power of money. Inflation is nothing but every year price rise calculated as a comparison of previous year price. In advanced countries like U S A, U K, Germany, France and Japan the inflation rate are below 4%. In India before 1990 inflation was 10% to 12%. Now the inflation in 2000 is below 5%. We are going well but the realisation in full may take further 5 years because still the prices are higher due to withdrawal of subsidies and concessions, which are not accommodated in inflation. The stock market will march steadily with low levels of inflation.

D) Foreign Exchange Reserves

A developing economy like India needs foreign exchange for meeting balance of payments deficits. We need earnings from exports, capital inflows and loans. Unfortunately our foreign exchange reserves declined low after the Iraq – Kuwait Gulf (crisis) war. The I M F has helped as to improve the reserves by timely loans.

In 1991, the New Economic Policy borned in India. A lot of foreign investments were invited instead of high loans and increasing interest burdens. After the new economic policy to country's foreign reserves to enormous level and we are in comfortable day when comparing before 1991 year. The Indian Stock Market improved and the number of Bombay stock exchange listing companies rose to 6000 from 1200 after 1991.

e] Public Debts and Foreign Debt: -

Public debt seems high in India Company to advanced countries. In India money market development is very poor. In U K money market seems well stabilized even better then U S A. Money market seems well stabilized even better than U S A.

The Lombard Street in London is tops than New York money market. In India there is no liquidity for sale of debt instruments. Now Indian government introduced D F I (Development Finance Institutions) like I C I C I, I D

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B I, and I F C I etc. These are directly controlled by Ministry of Finance. The above debt instruments are easily saleable in stock exchanges and also one can enjoy a high security in investing of D F I bonds. There are also many other Company Fixed Deposits.

Now our stock market is well improved. With the liberalization policy, Indian Companies collect bonds from various international markets, which are also having good liquidity.

F] Budget: -

Generally it is better to go for a deficit budget option for all developing nations like India. But the increase of deficit ratios will affect our stock market. We are discussing about budget in a separate chapter. Generally, a zero budget is suitable for the developed countries and a deficit budget will be helpful for the economic growth of the developing nations like India. However, the deficit level should be within controllable level.

G] Savings and Capital Output Ratio: -

Check your Progress

2. What are the two analytical models?
3. What are the components of Fundamental Analysis?

The domestic saving rate plays an important role in the country's economic development. If people save and deposit their money with the banking system, the economic growth will march forward. If all the people have balance money only in their hands, then money circulation will become low. It is the responsibilities of the government to attract are the savings in an organised channel like banks and utilise in a productive way. In India we are getting higher interest rate comparing to the advanced countries. In a liberalised economy the interest rates also come down say 4% to 5%.

The staggering economic success of post war Japan is partly attributed to the high savings rate of the Japanese. Indians are equally frugal. But while Japan is fast emerging as richest nation in the world, India is down in dumps. The main reason is that while the savings of Japanese are productively utilised in profitable private enterprise, we Indians have been literally swindled by our inefficient public enterprises which have swallowed an average of 3000 crores every year in forty years after independence.

H] Infrastructure: -

The infrastructure decides the fat of the economy. If the infrastructure is maintained cheap/low there will be better factor mobility. For example in India it is difficult to sell one kilogram of apple for 15 rupees in Kashmir. At the same time it is not possible to get one kilogram of apple below 60 rupees in Madras. Due to poor factor mobility there is much price discrimination

maintained by merchants and businessmen. If our government is providing low train fare for such seasonal fruits and sundries these fruits will easy move to madras from Kashmir and it is useful for Kashmir farmer and Madras consumer. The productivity of public infrastructure enterprises like banking, telecom, railways, coal, power, recently computers, interest and information technology oriented things, plays a crucial role in deciding the fate of any economy. Poor productivity in these sectors is harmful because all companies depend upon these for survival. With the liberalisation policy, our government has allowed private telecom, private Internet Service Providers (I S P), and even in Indian Airlines government decided to withdraw its holding to 30% to boost a fast growth.

I] Government Policy

A liberalised economic policy by government helps encourage industry and improves employment prospects. Government all over the world including China, U S S R and Vietnam are trying to woo multinationals to invest in their countries. The Indian government before 1990 remains unfriendly towards them and kept all the doors closed. But after new economic policy our government liberalised multinational companies to increase their holding up to 50% and the FERA act is modified as FEMA act. (FERA – Foreign Exchange Regulation Act), (FEMA – Foreign Exchange Management Act). Companies which involves foreign investment / management are called as FERA companies. Some FERA Companies: -

1. Colgate Palmolive India Limited
2. Henkel Spic India Ltd.,
3. Nestle India Limited
4. Procter & Gamble India Limited
5. Glaxo India limited
6. Rossel Industries Ltd. And
7. Hindustan Lever limited.

(10) Interest Rates:

4.3.2. Industry Analysis

Industry analysis is a market strategy tool used by businesses to determine if they want to enter a product or service market. Investors must carefully analyze several aspects of the industry to determine if they can make a

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profit selling goods and services in the market. Analyzing economic factors, supply and demand, competitors, future conditions and government regulations will help management decide whether to enter an industry or invest money elsewhere.

Each industry has differences in terms of its customer base, market share among firms, industry-wide growth, competition, regulation and business cycles. Learning about how the industry works will give an investor a deeper understanding of a company's financial health.

Customers

Some companies serve only a handful of customers, while others serve millions. In general, it's a red flag (a negative) if a business relies on a small number of customers for a large portion of its sales because the loss of each customer could dramatically affect revenues. For example, think of a military supplier who has 100% of its sales with the U.S. government. One change in government policy could potentially wipe out all of its sales. For this reason, companies will always disclose in their 10-K if any one customer accounts for a majority of revenues.

Market Share

Understanding a company's present market share can tell volumes about the company's business. The fact that a company possesses an 85% market share tells you that it is the largest player in its market by far. Furthermore, this could also suggest that the company possesses some sort of "economic moat," in other words, a competitive barrier serving to protect its current and future earnings, along with its market share. Market share is important because of economies of scale. When the firm is bigger than the rest of its rivals, it is in a better position to absorb the high fixed costs of a capital-intensive industry.

Industry Growth

One way of examining a company's growth potential is to first examine whether the amount of customers in the overall market will grow. This is crucial because without new customers, a company has to steal market share in order to grow.

In some markets, there is zero or negative growth, a factor demanding careful consideration. For example, a manufacturing company dedicated solely to creating audio compact cassettes might have been very successful in the '70s, '80s and early '90s. However, that same company would probably have

a rough time now due to the advent of newer technologies, such as CDs and MP3s. The current market for audio compact cassettes is only a fraction of what it was during the peak of its popularity.

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Competition

Simply looking at the number of competitors goes a long way in understanding the competitive landscape for a company. Industries that have limited barriers to entry and a large number of competing firms create a difficult operating environment for firms.

One of the biggest risks within a highly competitive industry is pricing power. This refers to the ability of a supplier to increase prices and pass those costs on to customers. Companies operating in industries with few alternatives have the ability to pass on costs to their customers. A great example of this is Wal-Mart. They are so dominant in the retailing business, that Wal-Mart practically sets the price for any of the suppliers wanting to do business with them. If you want to sell to Wal-Mart, you have little, if any, pricing power.

Regulation

Certain industries are heavily regulated due to the importance or severity of the industry's products and/or services. As important as some of these regulations are to the public, they can drastically affect the attractiveness of a company for investment purposes.

In industries where one or two companies represent the entire industry for a region (such as utility companies), governments usually specify how much profit each company can make. In these instances, while there is the potential for sizable profits, they are limited due to regulation.

In other industries, regulation can play a less direct role in affecting industry pricing. For example, the drug industry is one of most regulated industries. And for good reason - no one wants an ineffective drug that causes deaths to reach the market. As a result, the U.S. Food and Drug Administration (FDA) requires that new drugs must pass a series of clinical trials before they can be sold and distributed to the general public. However, the consequence of all this testing is that it usually takes several years and millions of dollars before a drug is approved. Keep in mind that all these costs are above and beyond the millions that the drug company has spent on research and development.

All in all, investors should always be on the lookout for regulations that could potentially have a material impact upon a business' bottom line. Inves-

tors should keep these regulatory costs in mind as they assess the potential risks and rewards of investing.

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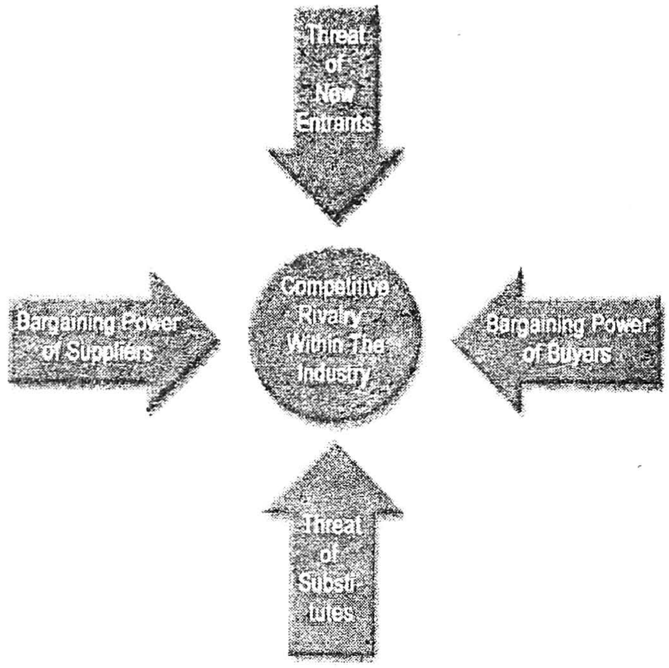

Figure 1: Porter's five competitive forces

1. Threat of New Entrants - **The easier it is for new companies to enter the industry, the more cutthroat competition there will be. Factors that can limit the threat of new entrants are known as barriers to entry. Some examples include:**
   - Existing loyalty to major brands
   - Incentive for using a particular buyer (such as frequent shopper programs)
   - High fixed costs
   - Scarcity of resources
   - High costs of switching companies
   - Government restrictions or legislation

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1. **Power of Suppliers** - This is how much pressure suppliers can place on a business. If one supplier has a large enough impact to affect a company's margins and volumes, then it holds substantial power. Here are a few reasons that suppliers might have power:

  - o There are very few suppliers of a particular product
  - o There are no substitutes
  - o Switching to another (competitive) product is very costly
  - o The product is extremely important to buyers - can't do without it
  - o The supplying industry has a higher profitability than the buying industry

1. **Power of Buyers** - This is how much pressure customers can place on a business. If one customer has a large enough impact to affect a company's margins and volumes, then the customer hold substantial power. Here are a few reasons that customers might have power:

   - Small number of buyers
   - Purchase large volumes
   - Switching to another (competitive) product is simple
   - The product is not extremely important to buyers; they can do without the product for a period of time.
   - Customer are price sensitive.

   1. Availability of Substitutes - What is the likelihood that someone will switch to a competitive product or service? If the cost of switching is low, then this poses a serious threat. Here are a few factors that can affect the threat of substitutes:

      - The main issure is the similarity of substitutes For example. if the price of coffee rises substantially, a coffee drinker may switch over to a beverage like tea.

      - If substitutes are similar, it can be viewed in the same light as a new entrant.

1. Competitive Rivalry - This describes the intensity of competition between existing firms in an industry. Highly competitive industries generally earn low returns because the cost of competition is high. A highly competitive market might result from:

   o Many players of about the same size; there is no dominant firm o Little differentiation between competitors products and services o

A mature industry with very little growth; companies can only grow by stealing customers away from competitors

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INDUSTRY LIFE CYCLE

Today, we will see, different life stages in a particular industry. There are stages in everybody's life like childhood, adult, middle age and then old age. Likewise, there are FOUR stages in every industry's life cycle.

If you observe the Gaming industry closely, you will find that there are many firms out there having high investment rates, high rates of return on investments and low rates of dividend payout. The same observation can be conducted on steel industry and you will find firms with low rates of investment, low rates of return and higher dividends payout. What could be the possible reason for this difference? Let's find out.

In Recent times, better opportunities have been created by available technologies for substantially profitable investment of resources. Patents safeguard new products and there are high profit margins. Such rewarding opportunities allure the firms in putting all profits back into the firm and the growth of firms, on an average, is speedy.

However, the growth must slow down in due course of time. Looking at the high profit rates, more and more firms are encouraged to enter into the industry. As a result, the competition increases affecting the prices and profit rates. Advanced and new technologies start becoming more obvious, extent of risks decreases making the entry easier. The degree of reinvestment in these firms reduces as the internal opportunities become less lucrative and the cash dividends become high.

Eventually, *cash cows* are noticed in a mature industry. By cash cows I mean firms having consistent cash flows, dividends and low risk levels. Growth rates may be analogous to that of overall economy. High risk and high returns on investments are offered by industries in initial stages of their life cycles. On the other hand; low risk and low returns are offered by mature industries.

Thus, from above analysis we can say that an *industry life cycle* can be classified into 4 stages:

Start-up stage in which growth is extremely fast, consolidation stage in which growth is not as fast as start-up stage but is faster than the general economy, maturity stage in which growth is not faster than the general economy and the relative decline stage in which the growth rate is less than that of general economy.

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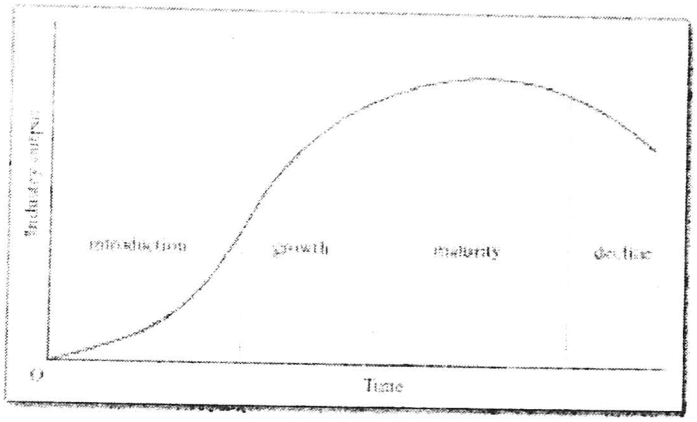

(*Stages in Industry Life Cycle*)

1. Start-Up Stage

New technologies like personal computers or wireless communication portray the initial stages of an industry. At this stage, it is very difficult to anticipate which firms will succeed; some firms will be a total success while some might fail completely. Hence, the risk involved in selecting any specific firm in the industry is quite high at this stage.

However, at this stage, since the new product has not yet flooded its market, there will be a rapid growth in sales and earnings at industry level. Like, for example, in 1980's, personal computers were a part of very few houses, while on the other hand, products like fans or even refrigerators were part of almost every household. So naturally, the growth rate of products like refrigerators will be much less.

2. Consolidation Stage

Once the product has proved itself in the market, several leaders in the industry start surfacing. The start-up stage survivors become more stable and market share can be easily envisaged. Thus, the performance of the industry in general will be more minutely tracked by the performance of the firms that have survived. As the product breaks through the market place and is used commonly, the growth rate of the industry is still faster than the rest of economy.

3. Maturity Stage

The product has attained the full aptitude to be consumed at this stage by the users. So, any growth from this point just tracks the growth of the economy in general. At this stage, as the product gets more and more standardized, it compels the producers to compete heavily on price basis. As a result, the profit margins are lowered and add to the pressure on profits. Most often, firms at this stage are referred to as *cash cows* as their cash flows are quite consistent but offer very little opportunity for growth of profit. Instead of reinvesting the cash flows in the company, they are best *milked from.*

4. Relative Decline

In this stage following features are identified.

- costs become counter-optimal
- sales volume decline or stabilize
- prices, profitability diminish
- profit becomes more a challenge of production/distribution efficiency than increased sales.

How to do industry analysis?

This s an equity research analyst, you need to analyze a particular industry, see the past trends, demand-supply mechanics and future outlook. You might work on industries like Oil and Gas, Metal, Information Technology, Automobile, Financial Services, Infrastructure, Pharmaceuticals and Consumer durables.

In some companies, there is a dedicated industry analyst who will work on the assigned industry and provide the analysis. However, as an analyst you should know the industry dynamics and hence it is important to know how to do industry analysis.

Steps :

1. Read the available industry reports and statistics, see whether it makes sense to dig deeper.
2. There are sub-parts in industries. For example, if you look at chemical industry, you will find sub-industries like Fertilizers, Pesticides, Paints and Varnishes, Organic chemicals. It is important to focus on the relevant industry. Also look at the different market segments in a particular industry.
3. Look at the demand-supply scenario for a particular product/ industry by studying the past trends and forecasting future outlook.
4. Study the competitive scenario: There is a framework of industry analysis. It is called *"Porter's five forces"* model. Michael Porter, a famous strategist and author, first came up with this model. In this model, five parameters are analyzed to see the competitive landscape. They are

   a) Barriers to entry,

   b) Supplier Power,

   c)Threat of substitutes,

d) Buyer power, and

e) Degree of rivalry

This model is used extensively while analyzing any industry.

5. Study and include recent developments, innovation in your industry analysis report.
6. Look at sector valuations and global comparative valuations.
7. The analysis should be specific to a particular industry and so it is important to focus and understand the industry dynamics.
8. Your industry analysis should be in-depth and to-the-point.

The above steps are important and you, as an analyst, should follow them. The analysts in private equity, investments banks, equity research firms, investment research firms need this skill and if you know how to do industry analysis, you are ahead of 80% of the aspirants as this will not only impress your interviewer, but also add immense value to you and the company you are working for.

These forces help us to analyze everything from the intensity of competition to the profitability and attractiveness of an industry. Figure 1 shows the relationship between the different competitive forces.

4.3.3 COMPANY ANALYSIS

After determining the economic and industry conditions, the company itself is analyzed to determine its financial health. This is usually done by studying the company's financial statements. From these statements a number of useful ratios can be calculated. The ratios fall under five main categories: profitability, price, liquidity, leverage, and efficiency. When performing ratio analysis on a company, the ratios should be compared to other companies within the same or similar industry to get a feel for what is considered "normal." At least one popular ratio from each category is shown below.

Net Profit Margin. A company's net profit margin is a profitability ratio calculated by dividing net income by total sales. This ratio indicates how much profit the company is able to squeeze out of each dollar of sales. For example, a net profit margin of 30%, indicates that Rs.30 of every Rs.100 in sales is realized in profits.

P/E Ratio. The P/E ratio (i.e., Price/Earnings ratio) is a price ratio calculated by dividing the security's current stock price by the previous four quarter's earnings per share (EPS).

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Check your Progress

4. What is Economic Analysis?
5. What is Industry Analysis?
6. What is Company Analysis?

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The P/E Ratio shows how much an investor must pay to "buy" $1 of the company's earnings. For example, if a stock's current price is $20 and the EPS for the last four quarters was $2, the P/E ratio is 10 (i.e., $20 / $2 = 10). This means that you must pay $10 to "buy" $1 of the company's earnings. Of course, investor expectations of company's future performance play a heavy role in determining a company's current P/E ratio.

A common approach is to compare the P/E ratio of companies within the same industry. All else being equal, the company with the lower P/E ratio is the better value.

Book Value Per Share. A company's book value is a price ratio calculated by dividing total net assets (assets minus liabilities) by total shares outstanding. Depending on the accounting methods used and the age of the assets, book value can be helpful in determining if a security is overpriced or under-priced. If a security is selling at a price far below book value, it may be an indication that the security is under-priced.

Current Ratio. A company's current ratio is a liquidity ratio calculated by dividing current assets by current liabilities. This measures the company's ability to meet current debt obligations. The higher the ratio the more liquid the company. For example, a current ratio of 3.0 means that the company's current assets, if liquidated, would be sufficient to pay for three times the company's current liabilities.

Debt Ratio. A company's debt ratio is a leverage ratio calculated by dividing total liabilities by total assets. This ratio measures the extent to which total assets have been financed with debt. For example, a debt ratio of 40% indicates that 40% of the company's assets have been financed with borrowed funds. Debt is a two-edged sword. During times of economic stress or rising interest rates, companies with a high debt ratio can experience financial problems. However, during good times, debt can enhance profitability by financing growth at a lower cost.

Inventory Turnover. A company's inventory turnover is an efficiency ratio calculated by dividing cost of goods sold by inventories. It reflects how effectively the company manages its inventories by showing the number of times per year inventories are turned over (replaced). Of course, this type of ratio is highly dependent on the industry. A grocery store chain will have a much higher turnover than a commercial airplane manufacturer. As stated previously, it is important to compare ratios with other companies in the same industry.

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Stock Price Valuation

After determining the condition and outlook of the economy, the industry, and the company, the fundamental analyst is prepared to determine if the company's stock is overvalued, undervalued, or correctly valued.

Several valuation models have been developed to help determine the value of a stock. These include dividend models which focus on the present value of expected dividends, earnings models which focuses on the present value of expected earnings, and asset models which focus on the value of the company's assets.

There is no doubt that fundamental factors play a major role in a stock's price. However, if you form your price expectations based on fundamental factors, it is important that you study the price history as well or you may end up owning an undervalued stock that remains undervalued.

Understanding Financial Ratios

If you're trying to learn how to invest in the stock market, then you've probably seen terms like P/E ratio and Leverage. These are financial ratios, and understanding what these financial ratios are telling you about a company can make a difference between picking a winning stock or a dog

Financial Ratio Concepts

Before we begin our discussion of financial ratios, we need to lay out some ground rules concerning the use of these ratios. Whenever you're researching a stock

, you're trying to understand exactly what the financial ratios are revealing about the company. Many times, financial ratios will vary by industry. Therefore, it's important to understand how a company is performing relative to its industry.

On a higher level, it's important to understand how a company is performing relative to the entire market. That is why you'll often find financial ratios quoted alongside both an industry benchmark as well as a ratio for a market index such as the S&P 500.

Categories of Financial Ratios

Stock market analysts like to play with numbers, and this means we have many financial ratios to cover. To make learning these ratios easier, we're going to break them down into six different categories:

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- Growth Ratios
- Price Ratios
- Profitability Ratios
- Ratios of Financial Condition
- Investment Ratios
- Management Efficiency Ratios

As we begin to define the typical financial ratios you might encounter in each of these categories, we will emphasize the ratios experts believe are some of the better indicators of a quality stock. The key financial ratios discussed will be in bold type.

Growth Ratios

Growth ratios, or growth rates, tell us just how fast a company is growing. The most important of these growth ratios include:

· Sales (%) - Sales growth is normally stated in terms of a percentage growth from the prior year. Sales is the term used for operating revenues

, so it's important to see the sales growth rate as high as possible.

· Net Income (%) - Growth in net income

is even more important than sales because net income tells the investor how much money is left over after all of the operating costs are subtracted from sales.

· Dividends (%) - Dividend growth

is a good indicator of the financial health of a company. Some companies do not pay stock dividends at all; rather they use these excess profits to reinvest money back into the company to accelerate growth. The change in Dividends (%) should not be negative. That is, once a dividend rate is established, a company needs to have a very good reason to decrease the dividend payout.

Price Ratios

Price ratios are financial ratios that normalize a stock's selling price against a measure of the profitability of the company. Price ratios include:

· Price / Earnings Ratio - The price to earnings ratio, or P/E ratio

, is the stock's price divided by the latest 12 months of earnings per share. The P/E ratio is an indicator of the premium the investor will be paying for a stock. It is also an indicator of future growth expectations. In gen-

eral, the lower the P/E ratio, the better, because a high P/E ratio indicates payment of a premium for the stock's "potential" future earnings.

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· Price / Sales Ratio - The price to sales ratio

is the stock's price divided by the latest 12 months worth of sales. This measure became popular during the dot com years, when companies showed no earnings or profits. For that reason, it is not a very useful measure in today's environment.

· Price / Book Value Ratio - The price to book value ratiov is the stock's price divided by the book value of the company. A company's book value is a measure of the amount by which assets exceed liabilities (in terms of shareholder's equity). The price / book value ratio rarely falls below 1.0.

· Price / Cash Flow Ratio - The price to cash flow ratio is identical to the P/E ratio except that it removes non-cash expenses and other accounting adjustments such as depreciation from that measure.

Profitability Ratios

Profitability ratios, or profitability margins, are a good indicator of how efficient a company is operating. These measures are normally used to compare a company to its industry (as a benchmark), rather than the overall stock market

, since the profitability of companies can vary greatly by industry.

· Gross Margin (%) - The gross margin

is a ratio of a company's operating revenue to sales. Operating revenue is the company's sales revenue minus the cost of good sold.

· Pretax Margin (%) - Pretax margin is a ratio of the company's pretax profits divided by operating revenues.

· Net Profit Margin (%) - The net profit margin is the ratio of net profits to sales. This is the best indicator of the company's efficiency because net profit takes into consideration all expenses of the company. Investors want the net profit margin to be as high as possible.

Ratios of Financial Condition

Evaluating the financial condition of a company consists of two related, but distinct, types of measures. The first has to do with how much money the company has borrowed relative to how much money is "invested" in a company. This concept is known as leverage

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The second measure of financial condition has to do with a company's ability to pay back its creditors in terms of interest payments. The following ratios of financial condition measure these two aspects of a company's financial health:

· Debt / Equity Ratio - The debt / equity ratio is a measure of the long-term debt divided by the common stock equity. This financial ratio is a measure of leverage. The lower the debt to equity ratio, the less likely a company will be affected by a downturn in the economy.

· Current Ratio - The current ratio is a measure of the company's current assets divided by current liabilities based on the most recent quarter. The current ratio is used to provide guidance on a company's immediate financial health and its ability to meet current obligations.

· Quick Ratio - The quick ratio, or acid test, is the sum of cash and receivables divided by the total current liabilities from the most recent quarter. The quick ratio is another measure of a company's immediate financial condition.

· Leverage Ratio - The leverage ratio is calculated by taking the total assets and dividing them by total stock equity. The leverage ratio gives us an indication of the company's leverage. For example, if the ratio is high, then assets far exceed stock equity (meaning the company has a lot of debt relative to equity), and the company is considered leveraged.

· Interest Coverage - The interest coverage is the company's latest 12 months' earnings before interest and taxes (EBIT) divided by the latest 12 months' interest expense. Interest coverage tells us how easily a company can handle its debt service. The higher the interest coverage value, the easier it is for the company to pay back its debt.

Investment Ratios

This next set of financial ratios gives us a good indication of how efficiently the money invested in a company is providing a return to those investors.

· Return on Equity - A company's return on equity ratio, or ROE, is calculated by taking the latest 12 months' net income divided by common stock equity. The return on equity ratio is perhaps the most widely used, and most valuable, measure of how well a company is performing for its shareholders. The higher the return on equity, the better.

· Return on Capital - The return on capital, or ROC, is calculated by taking the latest 12-months' net income divided by invested capital. Invested capital is defined as long term debt plus common stock and preferred equity.

· Return on Assets - The return on assets ratio, or ROA, is determined by taking net income and dividing it by total assets. The measure is used to get a feel for how well a company is using their assets to generate earnings.

Management Efficiency Ratios

This last category of financial ratios is unique in that we would not consider any of these ratios as a primary driver of a stock's quality. That being said, it is important to understand exactly what these ratios are telling the investor:

· Revenue per Employee - The revenue per employee ratio is calculated by taking revenues and dividing them by the total employees of a company. The revenue per employee ratio gives us a feel for the labor intensity of a business.

4.4 ANSWERS TO CHECK YOUR PROGRESS

1. A method of evaluating a security that entails attempting to measure its intrinsic value by examining related economic, financial and other qualitative and quantitative factors.
2. Fundamental Analysis and Technical Analysis.
3. Economic Analysis, Industry Analysis and Company Analysis.
4. Analysis of Macro and Micro economics variables to find intrinsic value of shares.
5. This s an equity research analyst, you need to analyze a particular industry, see the past trends, demand-supply mechanics and future outlook
6. After determining the economic and industry conditions, the company itself is analyzed to determine its financial health. This is usually done by studying the company's finanancial statements.

4.5 REVIEW QUESTIONS

1. What are the indicators of economic analysis?
2. What is fundamental analysis? What are its assumptions? Explain the scope and purpose.

NOTES

3. Discuss the techniques of economic analysis. How does economic analysis help in investment decision?

4. Explain the techniques of industry analysis.

5. How do you explain the differences in the performance of companies with in the same industry?

4.6 REFERENCES

1. PORTFOLIO MANAGEMENT – Baruna S..K. and V. Raghunathan, J.R. Varma, Tata Mcgrawhill.

3. PORTFOLIO MANAGEMENT – S. Kevin

4.. SECURITY ANALYUSIS AND PORTFOLIO MANAGEMENT - S. Kevin

5. SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT – M. Renganatham and R. Madhumathi

6. WWW.MONSTER.COM

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TECHNICAL ANALYSIS

UNIT STRUCTURE

5.1 INTRODUCTION
5.2 ASSUMPTIONS
5.3 TECHNICAL ANALYSIS VS. FUNDAMENTAL ANALYSIS
5.4 DOW THEORY
5.5 CHARTING
5.6 CHART PATTERNS
5.7 ANSWERS TO CHECK YOUR PROGRESS
5.8 REVIEW QUESTIONS
5.9 REFERENCES

UNIT OBJECTIVES

1. To know how to use share price information for investment purpose
2. How to prepare and apply various charts
3. To understand about the Dow Theory and its applications
4. To understand Elliot wave theory and its applications

5.1 INTRODUCTION

Technical Analysis is the forecasting of future financial price movements based on an examination of past price movements. Like weather forecasting, technical analysis does not result in absolute predictions about the future. Instead, technical analysis can help investors anticipate what is "likely" to happen to prices over time. Technical analysis uses a wide variety of charts that show price over time.

What is Technical Analysis?

It is a method of evaluating securities by analyzing statistics generated by market activity, such as past prices and volume. Technical analysts do not attempt to measure a security's intrinsic value, but instead use charts and other tools to identify patterns that can suggest future activity.

Technical analysts believe that the historical performance of stocks and markets are indications of future performance.

In a shopping mall, a fundamental analyst would go to each store, study the product that was being sold, and then decide whether to buy it or not. By contrast, a technical analyst would sit on a bench in the mall and

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watch people go into the stores. Disregarding the intrinsic value of the products in the store, the technical analyst's decision would be based on the patterns or activity of people going into each store.

5.2 ASSUMPTIONS

The field of technical analysis is based on three assumptions

1. The market discounts everything.
2. Price moves in trends.
3. History tends to repeat itself.

1. The Market Discounts Everything

A major criticism of technical analysis is that it only considers price movement, ignoring the fundamental factors of the company. However, technical analysis assumes that, at any given time, a stock's price reflects everything that has or could affect the company - including fundamental factors. Technical analysts believe that the company's fundamentals, along with broader economic factors and market psychology, are all priced into the stock, removing the need to actually consider these factors separately. This only leaves the analysis of price movement, which technical theory views as a product of the supply and demand for a particular stock in the market.

2. Price Moves in Trends

In technical analysis, price movements are believed to follow trends. This means that after a trend has been established, the future price movement is more likely to be in the same direction as the trend than to be against it. Most technical trading strategies are based on this assumption.

Check your Progress

1. What is technical analysis?

3. History Tends To Repeat Itself

Another important idea in technical analysis is that history tends to repeat itself, mainly in terms of price movement. The repetitive nature of price movements is attributed to market psychology; in other words, market participants tend to provide a consistent reaction to similar market stimuli over time. Technical analysis uses chart patterns to analyze market movements and understand trends. Although many of these charts have been used for more than 100 years, they are still believed to be relevant because they illustrate patterns in price movements that often repeat themselves.

5.3 TECHNICAL ANALYSIS VS. FUNDAMENTAL ANALYSIS

These terms refer to two different stock-picking methodologies used for researching and forecasting the future growth trends of stocks. Like any in-

vestment strategy or philosophy, both have their advocates and adversaries. Here are the defining principles of each of these methods of stock analysis:

· Fundamental analysis is a method of evaluating securities by attempting to measure the intrinsic value of a stock. Fundamental analysts study everything from the overall economy and industry conditions to the financial condition and management of companies.

· Technical analysis is the evaluation of securities by means of studying statistics generated by market activity, such as past prices and volume. Technical analysts do not attempt to measure a security's intrinsic value but instead use stock charts to identify patterns and trends that may suggest what a stock will do in the future.

In the world of stock analysis, fundamental and technical analysis are on completely opposite sides of the spectrum. Earnings, expenses, assets and liabilities are all important characteristics to fundamental analysts, whereas technical analysts could not care less about these numbers. Which strategy works best is always debated, and many volumes of textbooks have been written on both of these methods. So, do some reading and decide for yourself which strategy works best with your investment philosophy.

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Check your Progress

2. Explain Dow theory?

5.4 DOW THEORY

Dow Theory on stock price movement is a form of technical analysis that includes some aspects of sector rotation. The theory was derived from 255 Wall Street Journal editorials written by Charles H. Dow (1851–1902), journalist, founder and first editor of the Wall Street Journal and co-founder of Dow Jones and Company. Following Dow's death, William Peter Hamilton, Robert Rhea and E. George Schaefer organized and collectively represented "Dow Theory," based on Dow's editorials. Dow himself never used the term "Dow Theory," nor presented it as a trading system.

The six basic tenets of Dow Theory as summarized by Hamilton, Rhea, and Schaefer are described below.

Six basic tenets of Dow Theory

1. The market has three movements

(*1*) The "main movement", primary movement or major trend may last from less than a year to several years. It can be bullish or bearish. (*2*) The "medium swing", secondary reaction or intermediate reaction may last from ten days to three months and generally retraces from 33% to 66% of the primary price change since the previous medium swing or start of the main

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movement. (3) The "short swing" or minor movement varies with opinion from hours to a month or more. The three movements may be simultaneous, for instance, a daily minor movement in a bearish secondary reaction in a bullish primary movement.

2. Market trends have three phases

Dow Theory asserts that major market trends are composed of three phases: an accumulation phase, a public participation phase, and a distribution phase. The accumulation phase (*phase 1*) is a period when investors "in the know" are actively buying (selling) stock against the general opinion of the market. During this phase, the stock price does not change much because these investors are in the minority demanding (absorbing) stock that the market at large is supplying (releasing). Eventually, the market catches on to these astute investors and a rapid price change occurs (*phase 2*). This occurs when trend followers and other technically oriented investors participate. This phase continues until rampant speculation occurs. At this point, the astute investors begin to distribute their holdings to the market (*phase 3*).

3. The stock market discounts all news

Stock prices quickly incorporate new information as soon as it becomes available. Once news is released, stock prices will change to reflect this new information. On this point, Dow Theory agrees with one of the premises of the efficient market hypothesis.

4. Stock market averages must confirm each other

In Dow's time, the US was a growing industrial power. The US had population centers but factories were scattered throughout the country. Factories had to ship their goods to market, usually by rail. Dow's first stock averages were an index of industrial (manufacturing) companies and rail companies. To Dow, a bull market in industrials could not occur unless the railway average rallied as well, usually first. According to this logic, if manufacturers' profits are rising, it follows that they are producing more. If they produce more, then they have to ship more goods to consumers. Hence, if an investor is looking for signs of health in manufacturers, he or she should look at the performance of the companies that ship the output of them to market, the railroads. The two averages should be moving in the same direction. When the performance of the averages diverge, it is a warning that change is in the air.

Both Barron's Magazine and the Wall Street Journal still publish the daily performance of the Dow Jones Transportation Index in chart form. The

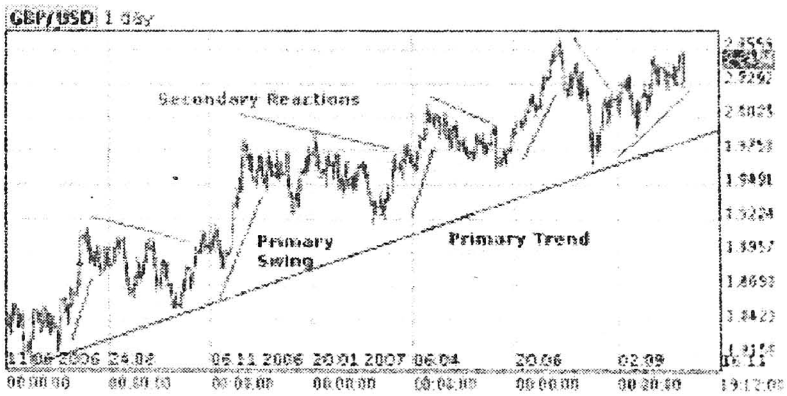
index contains major railroads, shipping companies, and air freight carriers in the US.

5. Trends are confirmed by volume

Dow believed that volume confirmed price trends. When prices move on low volume, there could be many different explanations why. An overly aggressive seller could be present for example. But when price movements are accompanied by high volume, Dow believed this represented the "true" market view. If many participants are active in a particular security, and the price moves significantly in one direction, Dow maintained that this was the direction in which the market anticipated continued movement. To him, it was a signal that a trend is developing.

6. Trends exist until definitive signals prove that they have ended

Dow believed that trends existed despite "market noise". Markets might temporarily move in the direction opposite to the trend, but they will soon resume the prior move. The trend should be given the benefit of the doubt during these reversals. Determining whether a reversal is the start of a new trend or a temporary movement in the current trend is not easy. Dow Theorists often disagree in this determination. Technical analysis tools attempt to clarify this but they can be interpreted differently by different investors.



Dow Theory - Trends

Dow recognized that trends changed when the pattern of peaks and troughs reversed.

Bull Trends

A bull trend is identified by a series of rallies where each rally exceeds the highest point of the previous rally. The decline between rallies ends above the lowest point of the previous decline. A series of successive higher highs and higher lows.

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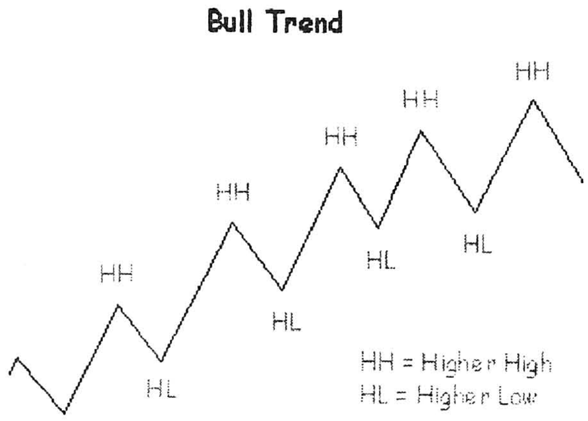
Check your Progress

3. What is bull market?

- Bull markets commence with reviving confidence as business conditions improve.
- Prices rise as the market responds to improved earnings
- Rampant speculation dominates the market and price advances are based on hopes and expectations rather than actual results.

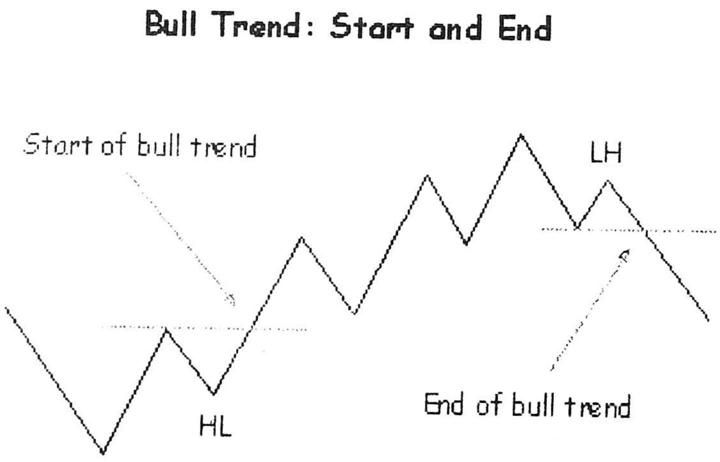


The start of an up trend is signaled when price makes a higher low (trough), followed by a rally above the previous high(peak):

Start = higher Low + break above previous High.

The end is signaled by a lower high (peak), followed by a decline below the previous low (trough):

End = lower High + break below previous Low.



What if the series of higher Highs and higher Lows is first broken by a lower Low? There are two possible interpretations - see Large Corrections.

Incredible Charts

Free Charting Software ✓ Auto-Fit Trendlines

✓ Trend Channels

✓ Linear Regression Channels

✓ Raff Regression Channels

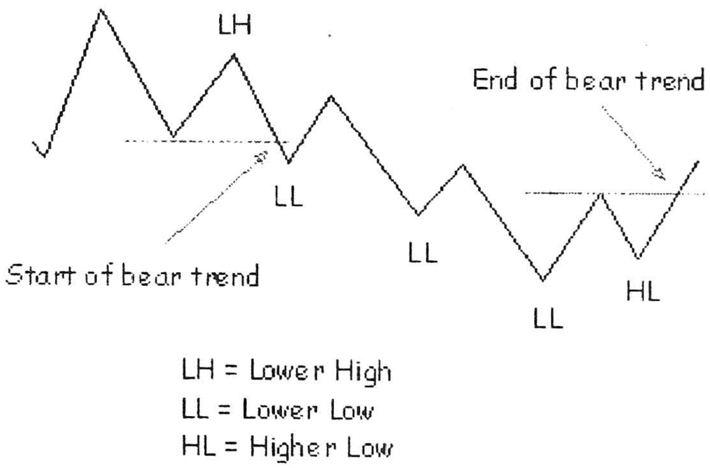
✓ Standard Deviation Channels

Bear Trends

Each successive rally fails to penetrate the high point of the previous rally. Each decline terminates at a lower point than the preceding decline. A series of successive lower highs and lower lows.

- Bear markets start with abandonment of the hopes and expectations that sustained inflated prices.
- Prices decline in response to disappointing earnings.
- Distress selling follows as speculators attempt to close out their positions and securities are sold without regard to their true value.

Bear Trend



A bear trend starts at the end of a bull trend: when a rally ends with a lower peak and then retreats below the previous low. The end of a bear trend is identical to the start of a bull trend.

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Check your Progress

4. What is bear market?

What if the series of lower Highs and lower Lows is first broken by a higher High? This is a gray area - see Large Corrections below.

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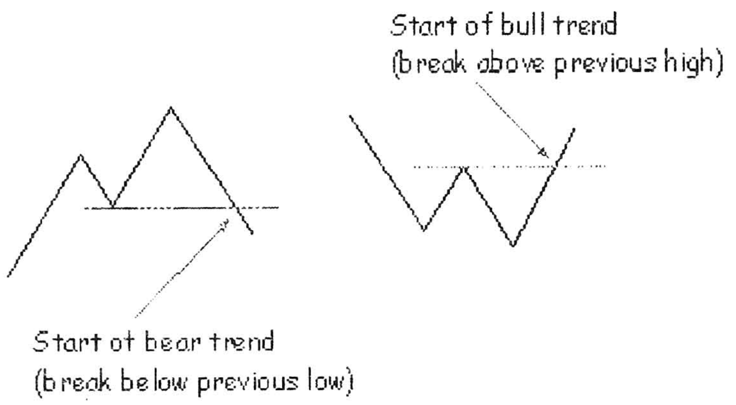
Large Corrections

A large correction occurs when price falls below the previous low (during a bull trend) or where price rises above the previous high (in a bear trend).

Large Corrections: Start and End of Trends



Some purists argue that a trend ends if the sequence of higher highs and higher lows is broken. Others argue that a bear trend has not started until there is a lower High and Low nor has a bull trend started until there is a higher Low and High.

For practical purposes, only accept large corrections as trend changes in the primary trend.

Basic Principles of Technical Analysis

Technical analysis is based on major principle-trend. The one constant about the markets is that they trend. Traders and investors hope to buy a security at the beginning of an uptrend at a low price, ride the trend, and sell the security when the trend ends at a high price. This is always easier said than done..

- The first principle of technical analysis is that the interaction of supply and demand determine price.
- The second principle of technical analysis is that the supply and demand are affected by investors' emotions, particularly fear and greed.
- The third principle of technical analysis is that prices discount everything.
- The fourth principle of technical analysis is that prices trend.

- The fifth principle of technical analysis is that recognizable patterns form with trend.
- To finish, it is important to know that these 5 principles do not cover every aspect of technical analysis

5.5 CHARTING

OHLC Chart

An **open-high-low-close chart** (also **OHLC chart**, or simply **bar chart**) is a type of chart typically used to illustrate movements in the price of a financial instrument over time. Each vertical line on the chart shows the price range (the highest and lowest prices) over one unit of time, e.g. one day or one hour. Tick marks project from each side of the line indicating the opening price (e.g. for a daily bar chart this would be the starting price for that day) on the left, and the closing price for that time period on the right. The bars may be shown in different hues depending on whether prices rose or fell in that period.

Line Chart

A line chart or line graph is a type of graph, which displays information as a series of data points connected by straight line segments. It is a basic type of chart common in many fields. It is an extension of a scatter graph, and is created by connecting a series of points that represent individual measurements with line segments. A line chart is often used to visualize a trend in data over intervals of time – a time series – thus the line is often drawn chronologically.

Bar Chart

The bar chart are the most popular method of plotting a security price. A bar chart provides a plot of each price unit (open, high, low and close) for each period. This is four times as much information as a line chart.

Interpreting the bar chart is rather simple, each bar consists of a line and two marks on either side of the line. Have a look at the picture below paying particular attention to the bar on the far right of the chart, this is the last period plotted in this chart.

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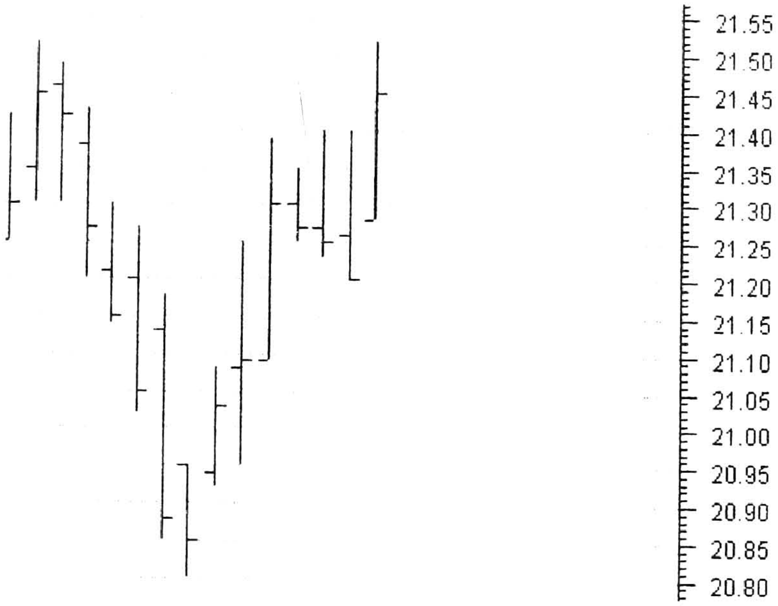


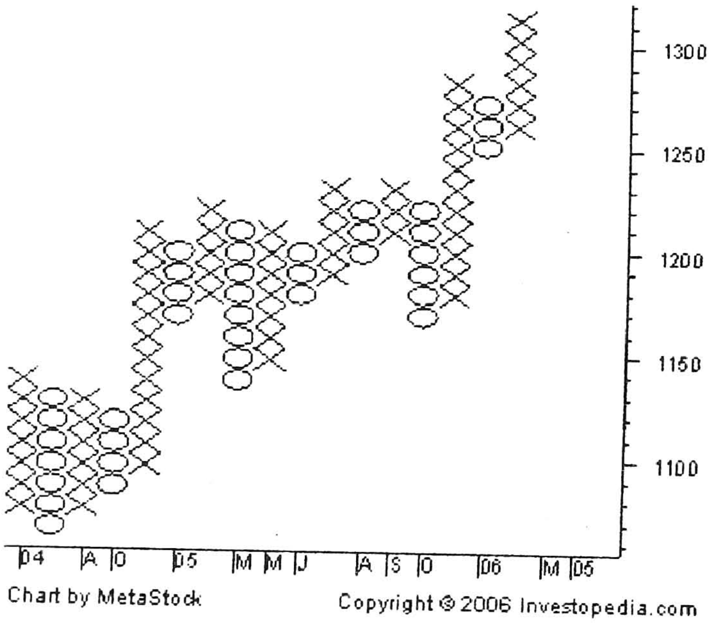
. The line represents the price extremes for the period, i.e. the high and the low. To draw this we would make a point at the high of the period and another point at the bottom of the period. Draw a line between the two and we have our basic bar.

Check your Progress

5. Examine various charts patterns

The next step is to add the open and close to the bar. The open is a tick placed on the left hand side of the bar and the close is a tick placed on the right hand side of the bar.

Point and figure is a charting technique used in technical analysis, used to attempt to predict financial market prices. Point and figure charting is unique in that it does not plot price against time as all other techniques do. Instead it plots price against changes in direction by plotting a column of Xs as the price rises and a column of Os as the price falls.



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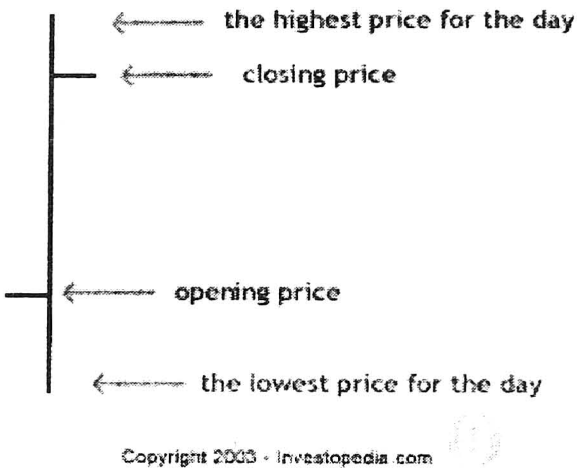
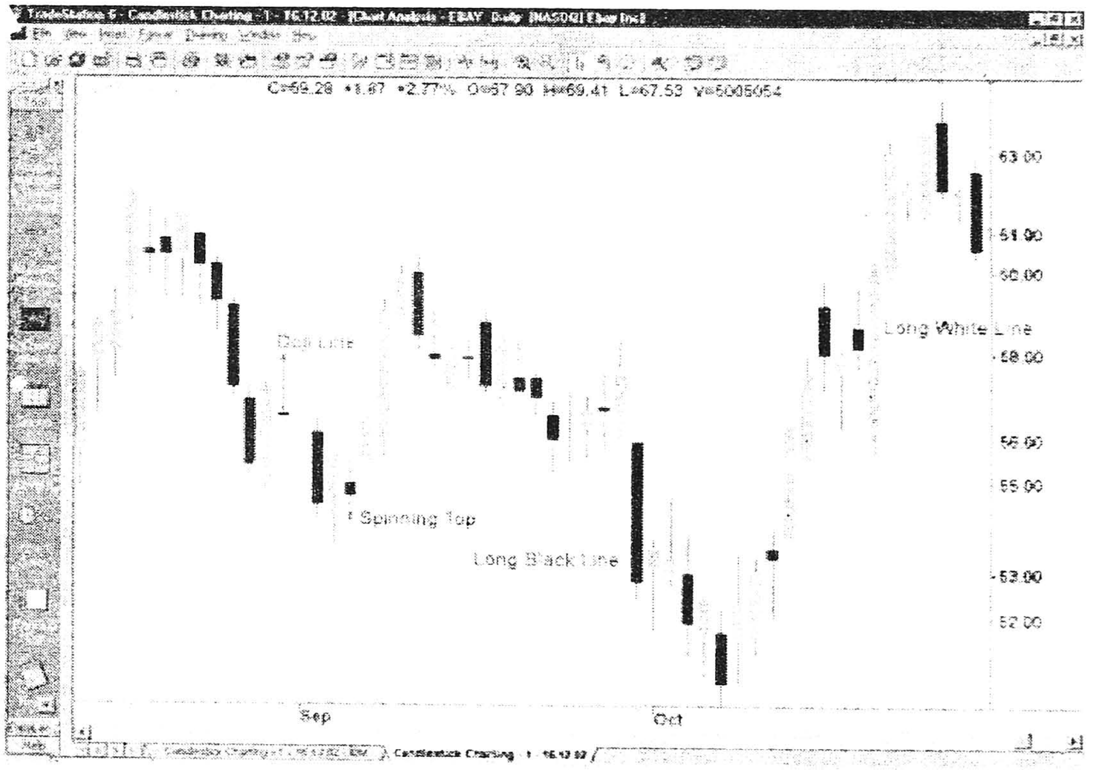
Price- Bar Chart

A style of chart used by some technical analysts, on which, as illustrated below, the top of the vertical line indicates the highest price a security traded at during the day, and the bottom represents the lowest price. The closing price is displayed on the right side of the bar,. and the opening price is shown on the left side of the bar. A single bar like the one below represents one day of trading.



Japanese candlestick chart



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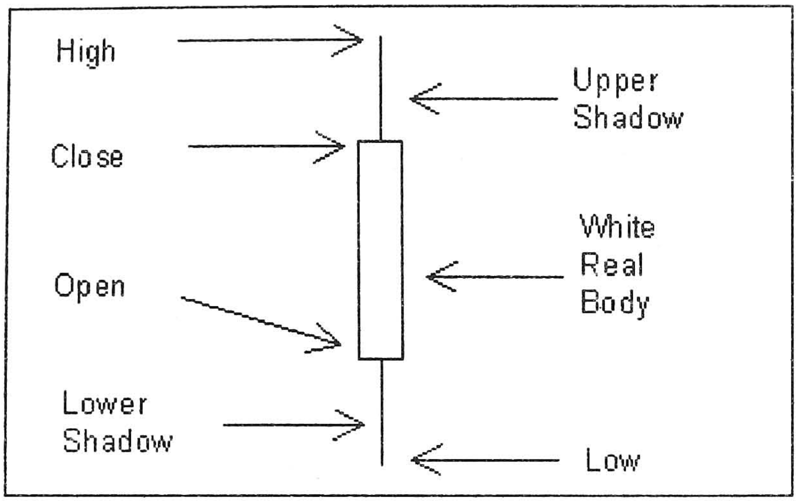
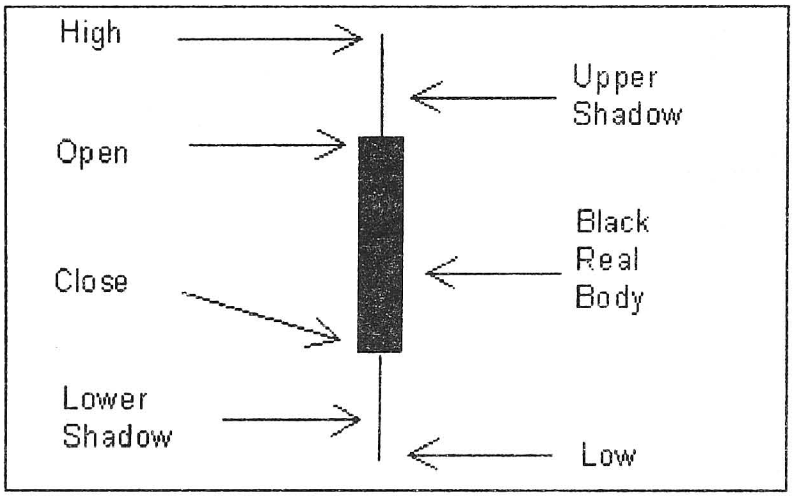
What do Candlesticks look like?

Candlestick charts are much more visually appealing than a standard two-dimensional bar chart. As in a standard bar chart, there are four elements necessary to construct a candlestick chart, the OPEN, HIGH, LOW and CLOSING price for a given time period. Below are examples of candlesticks and a definition for each candlestick component:





- The body of the candlestick is called the *real body*, and represents the range between the open and closing prices.
- A black or filled-in body represents that the close during that time period was lower than the open, (normally considered bearish) and when the body is open or white, that means the close was higher than the open (normally bullish).
- The thin vertical line above and/or below the real body is called the *upper/lower shadow*, representing the high/low price extremes for the period.

5.6 CHART PATTERNS

I) SUPPORT

Support is a term used to describe a point at which a securities price is supported by buyers. This point is often seen in charts as a turning point or a point at which the securities price seems to always stay above.

Support is related to resistance, which is also another topic in this section of the knowledge base.

We can further rationalise the definition of charting support by understanding the psychology of market participants. For example, support is a price point at which a downtrend is halted as more buyers enter the market at or near the support price.

This becomes memorised by market participants and the next time the security trades at or near that same support price it will once again find buyers. This basic psychology maintains the price support line.

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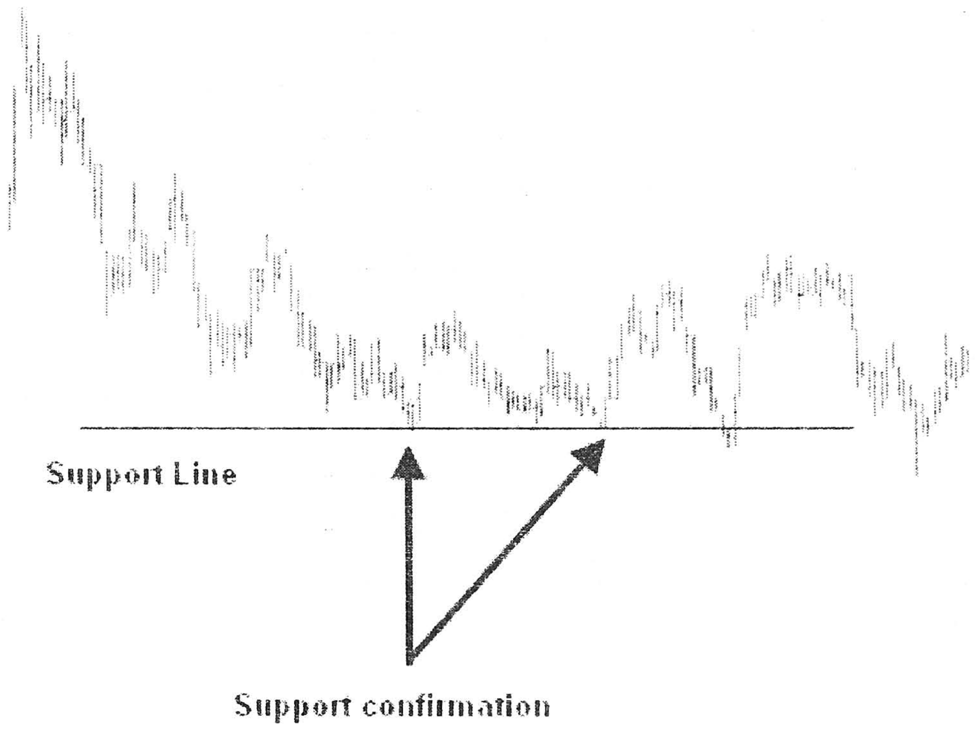

The picture shown above illustrates the concept of support clearly. You can see the securities price being supported at this particular price level.

Interpreting the Support Line

You should always remember that the support level for a security is determined by the combined trading behaviour and psychology of all market

participants. Sometimes you will see the price of the security bounce off a support line just before, after or exactly on it.

NOTES

The picture above shows this perfectly, you can see the security bounce off the support line just after falling below the support price. When we interpret these support bounces we can make the following analysis:

Price bouncing off the Support Line

The security will bounce off the exact support price when market participants have memorised the price as a support price and the culmination of all market buyers is enough to outnumber the market sellers.

Price bouncing just below the Support Line

This will occur when market participants (sellers) drive the price down past the support level too quickly before market buyers where able to set themselves.

Price bouncing just above the Support Line

This occurs when market participants anticipate the imminent support line and try to get into the security before the support line is reached. Market participants in this instance are acting to prevent being left behind as the security bounces off the support line.

The Strength of the Support Line.

You can gauge the strength of the support level by observing the following rules, you should also note that these rules are the same when confirming the strength of a resistance line.

1. The greater the volume around the level will indicate the number of market participants who acknowledge the level. The greater the volume the stronger the level as a valid support of resistance line.
2. Quite often you will find support and resistance lines around round numbers. Security prices of whole numbers, i.e. $1.00, $2.50.
3. The more recent the support of resistance level the greater number of market participants that have the level still committed to memory.
4. The number of times the level has been confirmed in the past will indicate the strength of the support or resistance level in the future. The more confirmations the stronger the level.

II) RESISTANCE

Resistance can be defined as a point at which the securities price finds significant resistance on this upside. This point is often seen in charts as a

turning point or a point at which the securities price seems to always stay below.

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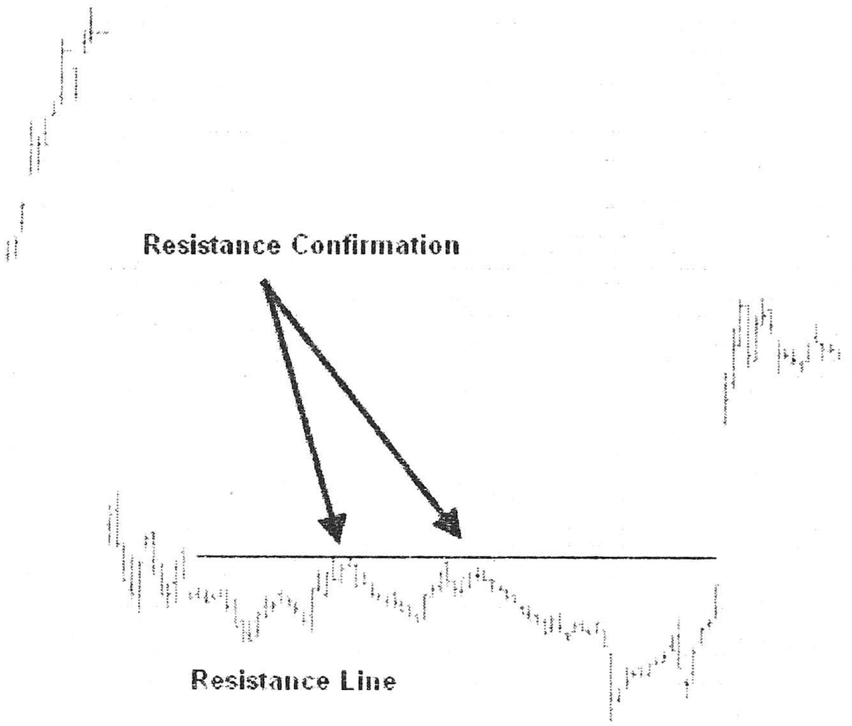
Resistance is related to support, which is also another topic in this section of the knowledge base.

The Resistance Line



The picture shown above illustrates the concept of resistance clearly. You can see the securities price being resisted at this particular price level.

The Strength of the Resistance Line

You can gauge the strength of the resistance level by observing the following rules, you should also note that these rules are the same when confirming the strength of a support line.

1. The greater the volume around the level will indicate the number of market participants who acknowledge the level. The greater the volume the stronger the level as a valid support of resistance line.
2. Quite often you will find support and resistance lines around round numbers. Security prices of whole numbers, i.e. $1.00, $2.50.
3. The more recent the support of resistance level the greater number of market participants that have the level still committed to memory.
4. The number of times the level has been confirmed in the past will indi-

cate the strength of the support or resistance level in the future. The more confirmations the stronger the level.

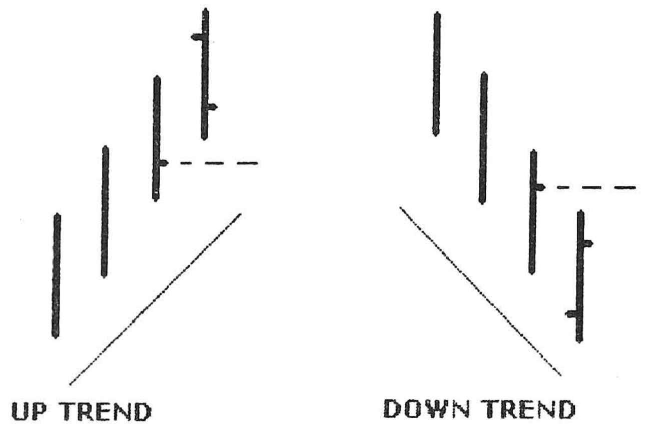
iii) REVERSAL PATTERN

Reversal signals attempt to identify the reverse of a trend. Technical analysts attempt to identify changes in the direction of a security based upon only price action. Each of the patterns described below have been identified as reasonable indicators of trend changes, as with all technical analysis some degree of subjectivity needs to be observed. Each reversal signal is an indicator that the existing trend my be at the end of its run, the existing trend is reaching exhaustion and will change to a new trend in the ensuing days.

The Open/Close Reversal

In an UP trend, the signal day will continue the trend (i.e. a higher high and higher low), the open of the signal day is near the high and the close is near the low. To confirm this as a valid signal the close needs to be above the previous close.

In a DOWN trend, the signal day will continue the trend (i.e. a lower high and lower low), the open of the signal day is near the low and the close is near the high. To confirm this as a valid signal, the close needs to be below the previous close.



The open/close signal day indicates to the technical analyst that the trend is nearing exhaustion. If we have a look at the action during the signal day you will note the high open with a gradual decline until the close near the low of the day. This action is counter-trend as previous days will have lower opens and strong closesIt is also noted that the effectiveness of each reversal signal is increased the stronger the existing trend.

NOTES

The closing price reversal

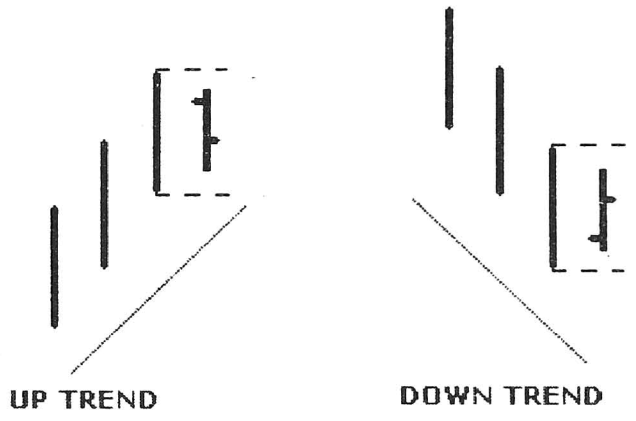
This signal is nearly identical to the open/close reversal, the only difference is that the close of the day signals weakness in the existing trend.The existing trend remains in-tact when this signal is observed.

A Closing price reversal signal is defined

In an UP trend, the signal day will continue the trend (i.e. a higher high and higher low), the open of the signal day is near the high and the close is near the low. To confirm this as a valid signal the close needs to be below the previous close, thus indicating a weakness in the existing trend.

In a DOWN trend, the signal day will continue the trend (i.e. a lower high and lower low), the open of the signal day is near the low and the close is near the high. To confirm this as a valid signal, the close needs to be above the previous close.

The Hook Reversal



A Hook reversal signal is defined:

In an UP trend, the signal day will be an inside day. The open of the signal day is near the high and the close is near the low. To confirm this as a valid signal the close needs to be below the open.

In a DOWN trend, the signal day will be an inside day. The open of the signal day is near the low and the close is near the high. To confirm this as a valid signal, the close needs to be above the open.

The Island Reversal

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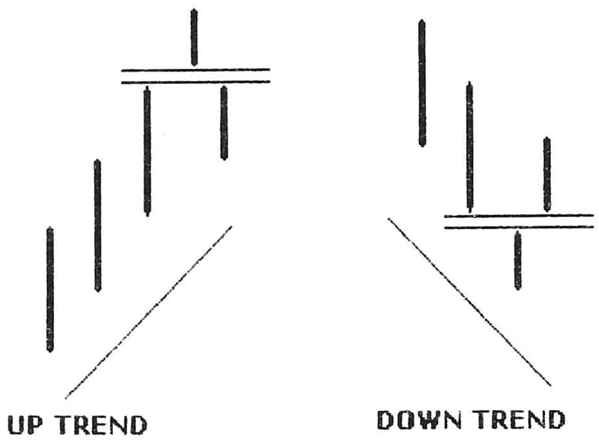


The Island reversal signal is identified by a gap day which precedes a day which breaks the trend. Either of the two days (gap day or following day) can be an Open/Close reversal as well.

The larger the gap in this signal the more effective the reversal signal.

An Island reversal signal is defined:

In an UP trend, the signal day will have a gap between its low and the previous high followed by a day which has a gap between its high and the low of the preceding day.

In a DOWN trend, the signal day will have a gap between its high and the previous low followed by a day which has a gap between its low and the high of the preceding day.

The Pivot Point Reversal

The Pivot point reversal is the only signal which is present at every market turn.

A Pivot point reversal signal is defined:

In an UP trend, a day whose high is higher than the highs of the days either side of it and the last day has a close which is lower than the low of the day with the highest high.

Continuation Patterns

Continuation patterns tend to be the most accurate when the trend has existed for around one to three months. The most common types of continuation patterns are triangles, flags and wedges.

Triangle

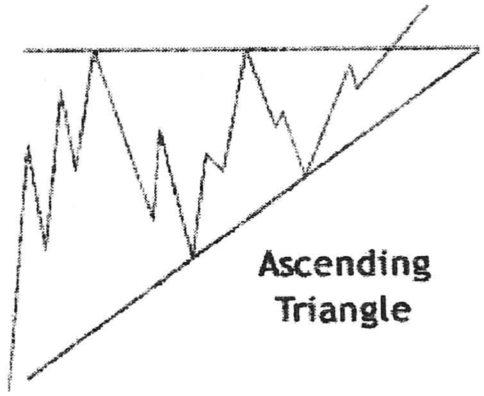
NOTES

In the study of technical analysis, triangles fall under the category of continuation patterns. There are three different looks of triangles, and each should be closely studied. These formations are, in no particular order, the ascending triangle, the descending triangle and the symmetrical triangle.

Triangles can be best described as horizontal trading patterns. At the start of its formation, the triangle is at its widest point. As the market continues to trade in a sideways pattern, the range of trading narrows, and the point of the triangle is formed. In its simplest form, the triangle shows losing interest in an issue, both from the buy side as well as the sell side: the supply line diminishes to meet the demand.

Think of the lower line of the triangle, or lower trendline, as the demand line, which represents support on the chart. At this point, the buyers of the issue outpace the sellers, and the stock's price begins to rise. The supply line is the top line of the triangle and represents the overbought side of the market, when investors are going out taking profits with them.

Ascending Triangle Pattern



Often a bullish chart pattern, the ascending triangle pattern in an uptrend is not only easy to recognize but is also a slam-dunk as a entry or exit signal. It should be noted that a recognized trend should be in place for the triangle to be considered a continuation pattern. In figure 1, you can see an uptrend is in place and the demand line, or lower trendline is drawn to touch the base of the rising lows. The two highs have formed at the top line. These highs do not have to have reach the same price point but should be close to each other.

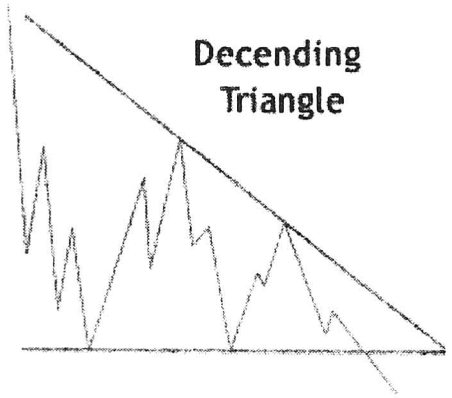
The buyers may not be able to break through the supply line at first and they may take a few runs at it before establishing new ground and new highs.

NOTES

The chartist will look for an increase in the trading volume as the key indication that new highs will form. An ascending triangle pattern will take about four weeks or so to form and will not likely last more than 90 days.

How do the longs (the buyers) know when to jump into the issue? Most analysts will take a position once the price action breaks through the top line of the triangle with increased volume, which is when the stock price should rise an amount equivalent to the widest section of the triangle.

Descending Triangle Pattern



The descending triangle is recognized primarily in downtrends and is often thought of as a bearish signal. As you can see in figure 2, the descending triangle pattern is the upside-down image of the ascending triangle pattern. The two lows on the above chart form the lower flat line of the triangle and, again, have to be only close in price action rather than exactly the same. The development of the descending triangle takes the same amount of time as the ascending triangle, and volume again plays an important role in the breakout to the downside.

Symmetrical Patterns

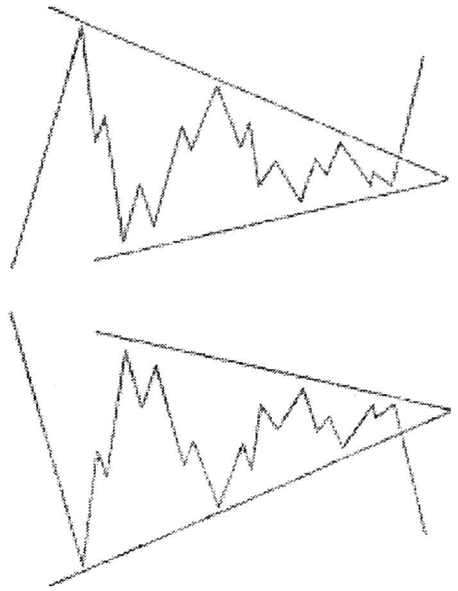
So far we have seen two triangle patterns. One, from an uptrend and bullish market move and one from a downtrend with a decidedly bearish look. Symmetrical triangles, on the other hand, are thought of as continuation patterns developed in markets that are, for the most part, aimless in direction. The market seems listless in its direction. The supply and demand therefore seem to be one and the same.

During this period of indecision, the highs and the lows seem to come together in the point of the triangle with virtually no significant volume. Investors just don't know what position to take. However, when the investors do figure out which way to take the issue, it heads north or south with big vol-

ume in comparison to that of the indecisive days and or weeks leading up to the breakout. Nine times out of ten, the breakout will occur in the direction of the existing trend. But, if you are looking for an entry point following a symmetrical triangle, jump into the fray at the breakout point.

NOTES

Symmetrical Triangles



These patterns, both the symmetrical triangles on the bullish as well as the bearish side are known to experience early breakouts that give investors a "head fake". Hold off for a day or two after the breakout and determine whether or not the breakout is for real. Experts tend to look for a one-day closing price above the trendline in a bullish pattern and below the trendline in bearish chart pattern.

Flag

A technical charting pattern that looks like a flag with a mast on either side. Flags result from price fluctuations within a narrow range and mark a consolidation before the previous move resumes. Likewise, "pennant" formations are usually treated like flag formations because they are very similar in appearance, tend to show up at the same place in an existing trend, and have the same volume and measuring criteria.

he flag pattern forms what looks like a rectangle. The rectangle is formed by two parallel trendlines that act as support and resistance for the price until the price breaks out. In general, the flag will not be perfectly flat but will have its trendlines sloping.

NOTES

Figure 1: The flag pattern

In general, the slope of the flag should move in the opposite direction of the initial sharp price movement; so if the initial movement were up, the flag should be downward sloping.

The buy or sell signal is formed once the price breaks through the support or resistance level, with the trend continuing in the prior direction. This breakthrough should be on heavier volume to improve the signal of the chart pattern.

The Pennant

The pennant forms what looks like a symmetrical triangle, where the support and resistance trendlines converge towards each other. The pennant pattern does not need to follow the same rules found in triangles, where they should test each support or resistance line several times. Also, the direction of the pennant is not as important as it is in the flag; however, the pennant is generally flat.

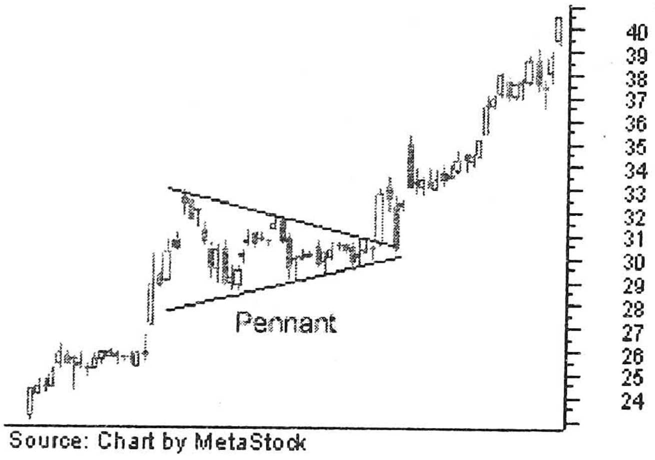


Figure 2: The Pennant

General Ideas

While the construct of the pause in the trend is different for the flag and pennant, the attributes of the chart patterns themselves are similar. It is vital that the price movement prior to the flag or pennant be a strong, sharp move.

Typically, these patterns take less time to form during downtrends than in uptrends. In terms of pattern length, they are generally short-term patterns lasting one to three weeks, but can be formed over longer periods.

ELLIOT WAVE THEORY

About Elliott Waves Theory Basics

The Elliott Wave Theory is named after Ralph Nelson Elliott. Inspired by the Dow Theory and by observations found throughout nature, Elliott concluded that the movement of the stock market could be predicted by observing and identifying a repetitive pattern of waves. In fact, Elliott believed that all of man's activities, not just the stock market, were influenced by these identifiable series of waves.

Elliott based part his work on the Dow Theory, which also defines price movement in terms of waves, but Elliott discovered the fractal nature of market action. Thus Elliott was able to analyze markets in greater depth, identifying the specific characteristics of wave patterns and making detailed market predictions based on the patterns he had identified.

Definition of Elliott Waves

In the 1930s, Ralph Nelson Elliott found that the markets exhibited certain repeated patterns. His primary research was with stock market data for the Dow Jones Industrial Average. This research identified patterns or waves that recur in the markets. Very simply, in the direction of the trend, expect five waves. Any corrections against the trend are in three waves. Three wave corrections are lettered as "a, b, c." These patterns can be seen in long-term as well as in short-term charts. Ideally, smaller patterns can be identified within bigger patterns. In this sense, Elliott Waves are like a piece of broccoli, where the smaller piece, if broken off from the bigger piece, does, in fact, look like the big piece. This information (about smaller patterns fitting into bigger patterns), coupled

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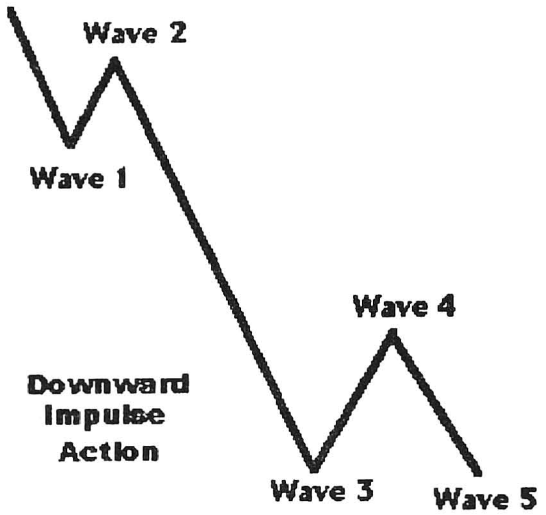
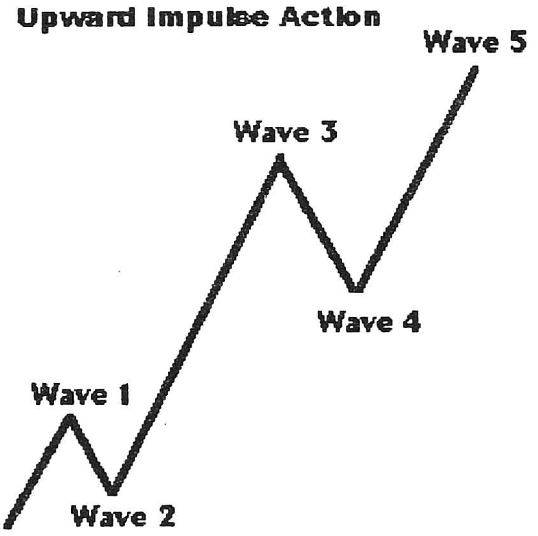




with the Fibonacci relationships between the waves, offers the trader a level of anticipation and/or prediction when searching for and identifying trading opportunities with solid reward/risk ratios.

There have been many theories about the origin and the meaning of the patterns that Elliott discovered, including human behavior and harmony in nature. These rules, though, as applied to technical analysis of the markets (stocks, commodities, futures, etc.), can be very useful regardless of their meaning and origin.

Simplifying Elliott Wave Analysis

Elliott Wave analysis is a collection of complex techniques. Approximately 60 percent of these techniques are clear and easy to use. The other 40 are difficult to identify, especially for the beginner. The practical and conservative approach is to use the 60 percent that are clear.

When the analysis is not clear, why not find another market conforming to an Elliott Wave pattern that is easier to identify?

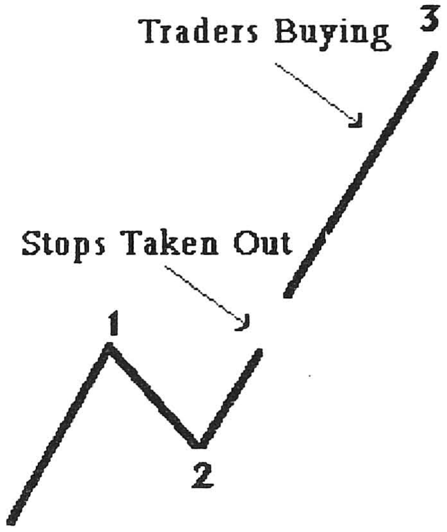
From years of fighting this battle, we have come up with the following practical approach to using Elliott Wave principles in trading.

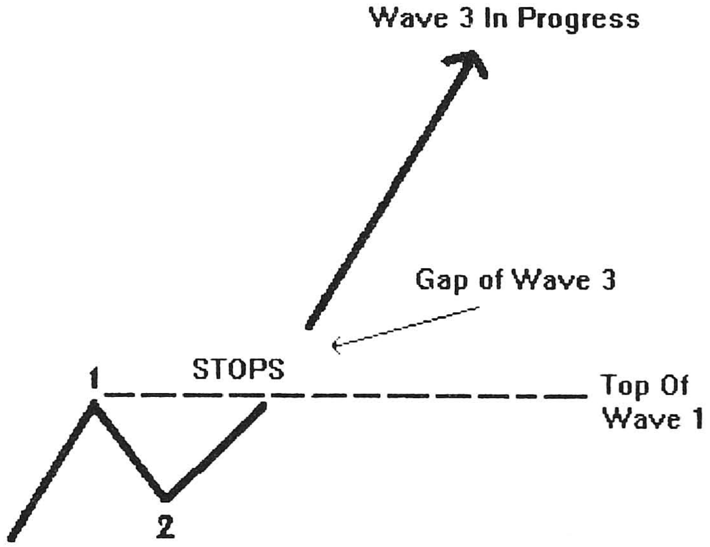
NOTES

The whole theory of Elliott Wave can be classified into two parts:

Elliott Wave Basics — Impulse Patterns

The impulse pattern consists of five waves. The five waves can be in either direction, up or down. Some examples are shown to the right and below.The first wave is usually a weak rally with only a small percentage of the traders participating. Once Wave 1 is over, they sell the market on Wave 2. The sell-off in Wave 2 is very vicious. Wave 2 will finally end without making new lows and the market will start to turn around for another rally.

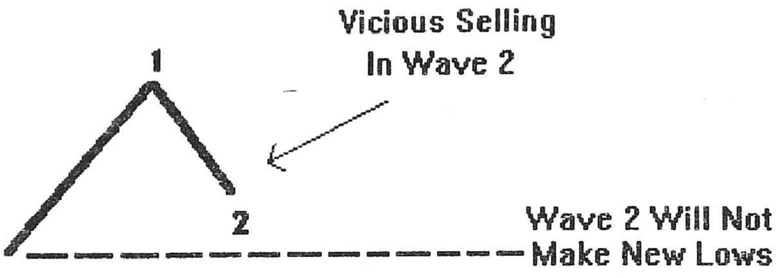




NOTES

The initial stages of the Wave 3 rally are slow, and it finally makes it to the top of the previous rally (the top of Wave 1).

At this time, there are a lot of stops above the top of Wave



Traders are not convinced of the upward trend and are using this rally to add more shorts. For their analysis to be correct, the market should not take the top of the previous rally.

Therefore, many stops are placed above the top of Wave 1.

The Wave 3 rally picks up steam and takes the top of Wave 1. As soon as the Wave 1 high is exceeded, the stops are taken out. Depending on the number of stops, gaps are left open. Gaps are a good indication of a Wave 3 in progress. After taking the stops out, the Wave 3 rally has caught the attention of traders

The next sequence of events are as follows: Traders who were initially long from the bottom finally have something to cheer about. They might even decide to add positions.

The traders who were stopped out (after being upset for a while) decide the trend is up, and they decide to buy into the rally. All this sudden interest fuels the Wave 3 rally.

This is the time when the majority of the traders have decided that the trend is up.

NOTES

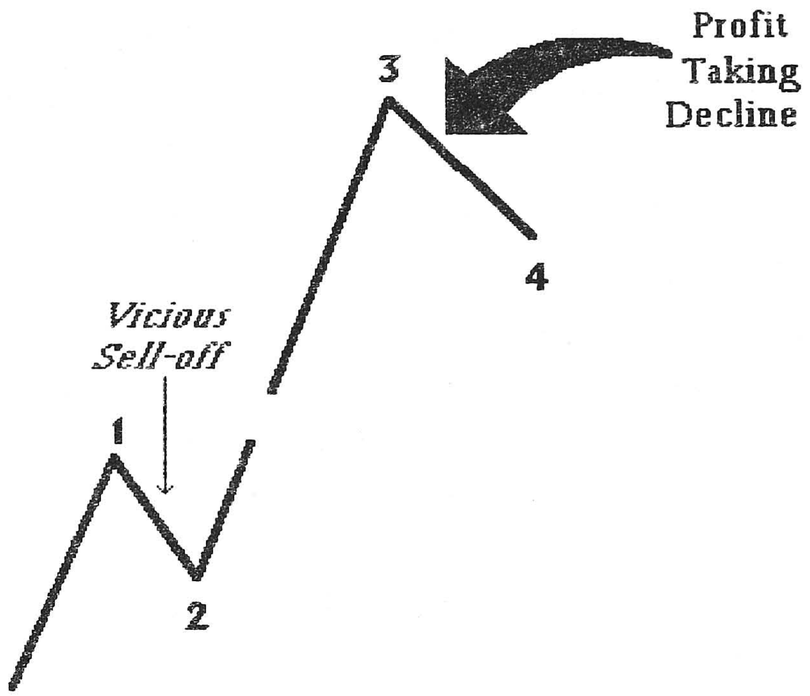
Finally, all the buying frenzy dies down; Wave 3 comes to a halt.

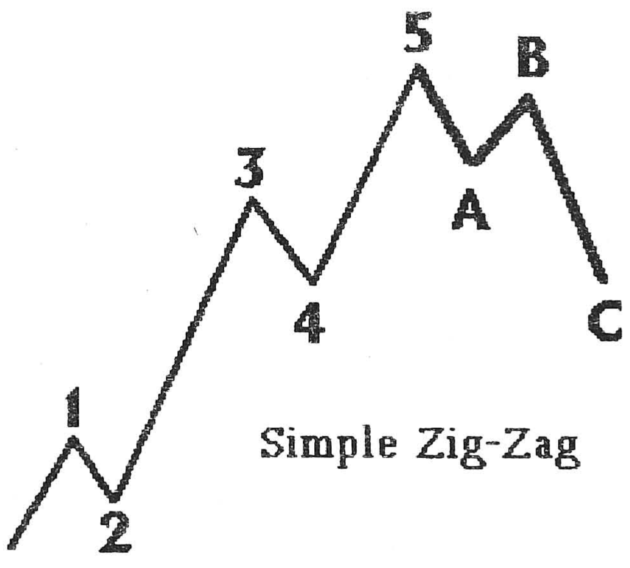
Profit taking now begins to set in. Traders who were long from the lows decide to take profits. They have a good trade and start to protect profits.This causes a pullback in the prices that is called Wave 4.

Wave 2 was a vicious sell-off; Wave 4 is an orderly profit-taking decline.

While profit-taking is in progress, the majority of traders are still convinced the trend is up. They were either late in getting in on this rally, or they have been on the sideline.

They consider this profit-taking decline an excellent place to buy in and get even.





Simple Zig-Zag

NOTES

On the end of Wave 4, more buying sets in and the prices start to rally again.

The Wave 5 rally lacks the huge enthusiasm and strength found in the Wave 3 rally. The Wave 5 advance is caused by a small group of traders.

Although the prices make a new high above the top of Wave 3, the rate of power, or strength, inside the Wave 5 advance is very small when compared to the Wave 3 advance.

Finally, when this lackluster buying interest dies out, the market tops out and enters a new phase.

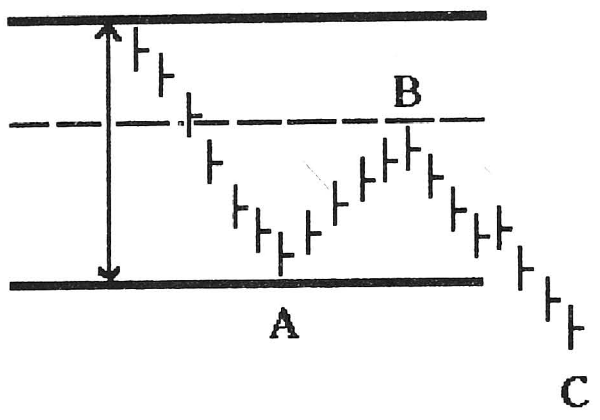
Elliott Wave Basics — Corrective Patterns

Corrections are very hard to master. Most Elliott traders make money during an impulse pattern and then lose it back during the corrective phase.

An impulse pattern consists of five waves. With the exception of the triangle, corrective patterns consist of 3 waves. An impulse pattern is always followed by a corrective pattern. Corrective patterns can be grouped into two different categories:

Simple Correction (Zig-Zag)

There is only one pattern in a simple correction. This pattern is called a Zig-Zag correction. A Zig-Zag correction is a three-wave pattern where the Wave B does not retrace more than 75 percent of Wave A. Wave C will make new lows below the end of Wave A. The Wave A of a Zig-Zag correction always has a five-wave pattern. In the other two types of corrections (Flat and Irregular), Wave A has a three-wave pattern. Thus, if you can identify a five-wave pattern inside Wave A of any correction, you can then expect the correction to turn out as a Zig-Zag formation.



A simple correction is commonly called a Zig-Zag correction

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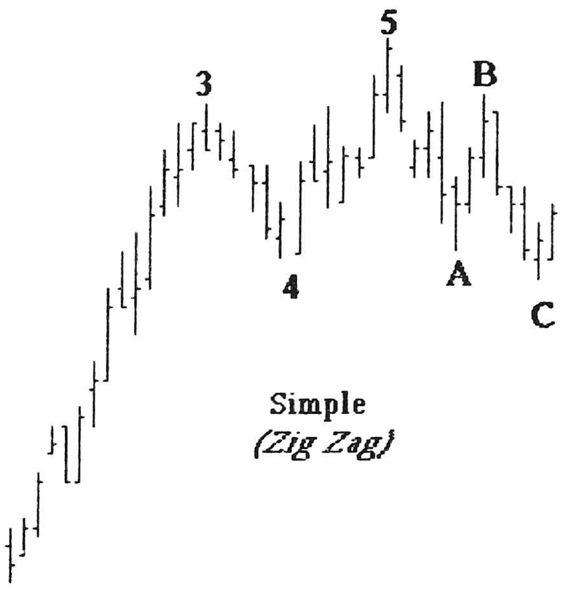


Simple
(Zig Zag)

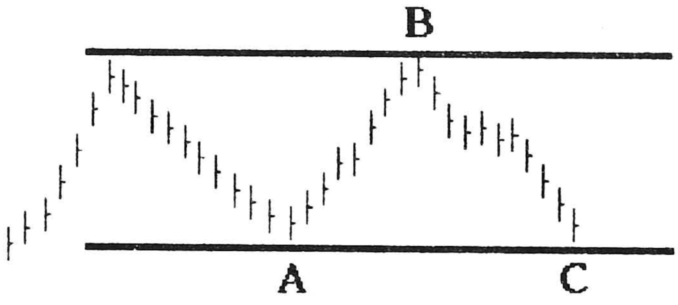
Complex Corrections (Flat, Irregular, Triangle)

The complex correction group consists of 3 patterns:

- Flat
- Irregular
- Triangle

Flat Correction

In a Flat correction, the length of each wave is identical. After a five-wave impulse pattern, the market drops in Wave A. It then rallies in a Wave B to the previous high. Finally, the market drops one last time in Wave C to the previous Wave A low.



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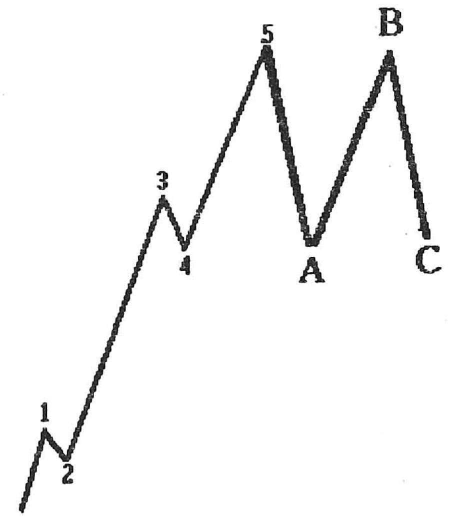
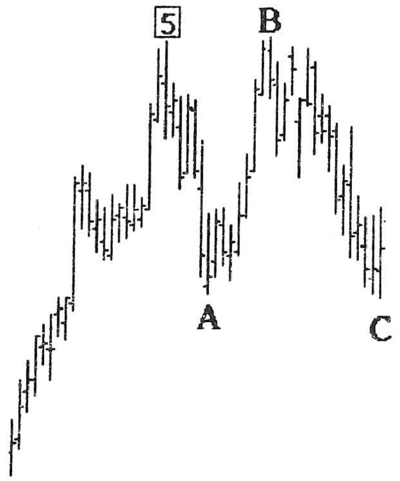
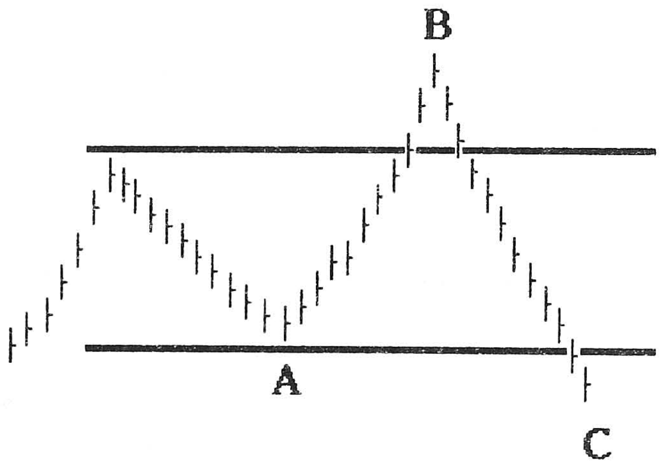




Irregular Correction

In this type of correction, Wave B makes a new high. The final Wave C may drop to the beginning of Wave A, or below it.



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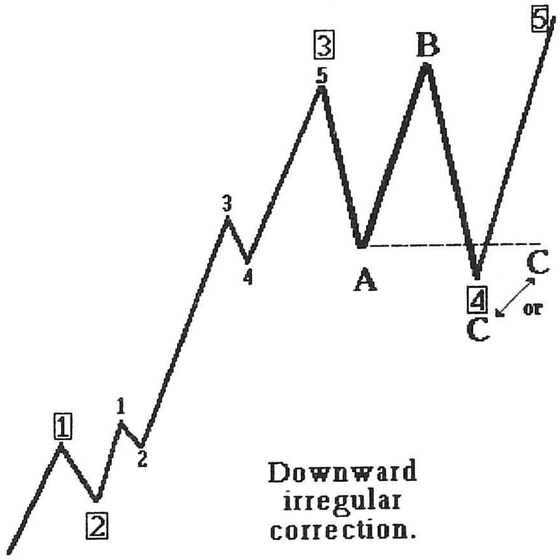
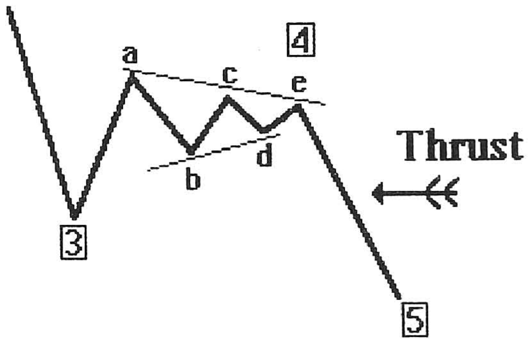
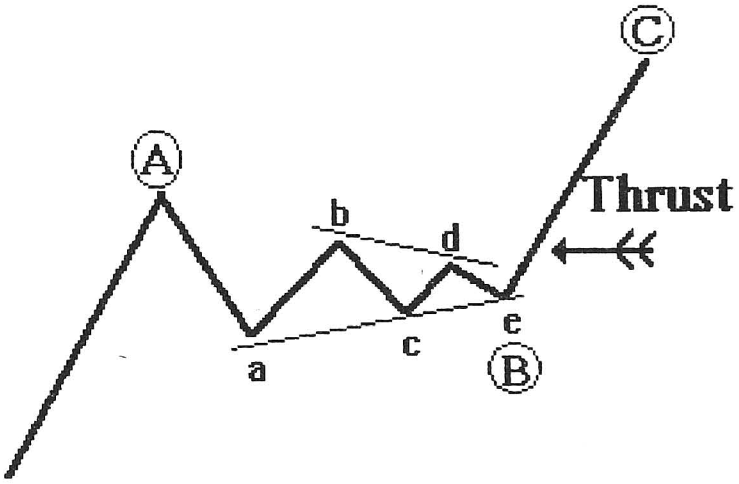


Triangle Correction

In addition to the three-wave correction patterns, there is another pattern that appears time and time again. It is called the Triangle pattern. Unlike other triangle studies, the Elliott Wave Triangle approach designates five sub-waves of a triangle as A, B, C, D and E in sequence





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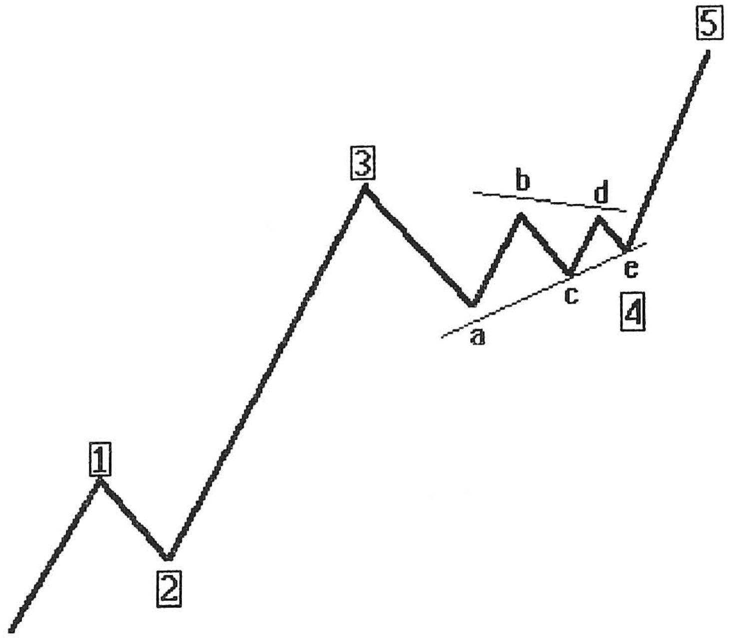

Triangles, by far, most commonly occur as fourth waves. One can sometimes see a triangle as the Wave B of a three-wave correction. Triangles are very tricky and confusing. One must study the pattern very carefully prior to taking action. Prices tend to shoot out of the triangle formation in a swift thrust.

When triangles occur in the fourth wave, the market thrusts out of the triangle in the same direction as Wave 3. When triangles occur in Wave Bs, the market thrusts out of the triangle in the same direction as the Wave A.

Alteration Rule

If Wave Two is a simple correction, expect
Wave Four to be a complex correction.
If Wave Two is a complex correction,
expect Wave Four to be a simple correction.

5.7 ANSWERS TO CHECK YOUR PROGRESS

1. Technical Analysis is the forecasting of future financial price movements based on an examination of past price movements.
2. Dow Theory on stock price movement is a form of technical analysis that includes some aspects of sector rotation.
3. Bull markets commence with reviving confidence as business conditions improve. Prices rise as the market responds to improved earnings; Ram-

pant speculation dominates the market and price advances are based on hopes and expectations rather than actual results.

4. Bear markets start with abandonment of the hopes and expectations that sustained inflated prices. Prices decline in response to disappointing earnings. Distress selling follows as speculators attempt to close out their positions and securities are sold without regard to their true value.

5. Line Chart, Bar Charts, Points and Figures chart ad Japanese Candle Stick charts.

5.8 REVIEW QUESTIONS

1. Discuss the formation of bullish trend and bearish trend in the market.
2. Describe the chart p patterns that help to identify trend reversal.
3. What is price chart? Describe the different types of price charts used by technical analysis.
4. "The Elliot Wave Theory is based on the principle that action is followed by reaction." Elucidate

5.9 REFERENCES

1. INVESTMENT ANALYLSIS AND PORTFOLIO MANAGEMENT – Prasanna Chandra – Tata Mc Graw Hill.+
2. PORTFOLIO MANAGEMENT – Baruna S..K. and V. Raghunathan, J.R. Varma, Tata Mcgrawhill.
3. PORTFOLIO MANAGEMENT – S. Kevin
4. SECURITY ANALYUSIS AND PORTFOLIO MANAGEMENT - S. Kevin
5. SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT – M. Renganatham and R. Madhumathi
6. WWW.INVESTOPEDIA.COM

NOTES

VALUATION OF EQUITY

UNIT STRUCTURE

6.1 Introduction
6.2 Stock Valuation Criteria
6.3 Valuation
6.4 Other Approaches To Valuation Of Equities
6.5 Preferred Stock Valuation
6.6 Stock Valuation Equations
6.7 What Is Equity Research?
6.8 Limitations Of The Valuation Model
6.9 Answers to check your progress
6.10 Review Questions
6.11 References

UNIT OBJECTIVES

1. To understand the equity valuation approach
2. To recognized the value of investor holding shares
3. To study the dividend valuation approach
4. To know multi factor valuation model

6.1 INTRODUCTION

In financial markets, stock valuation is the method of calculating theoretical values of companies and their stocks. The main use of these methods is to predict future market prices, or more generally potential market prices, and thus to profit from price movement stocks that are judged *undervalued* (with respect to their theoretical value) are bought, while stocks that are judged *overvalued* are sold, in the expectation that undervalued stocks will, on the whole, rise in value, while overvalued stocks will, on the whole, fall.

In the view of fundamental analysis, stock valuation based on fundamentals aims to give an estimate of their intrinsic value of the stock, based on predictions of the future cash flows and profitability of the business. Fundamental analysis may be replaced or augmented by market criteria what the market will pay for the stock, without any necessary notion of intrinsic value.

These can be combined as predictions of future cash flows/profits (fundamental), together with what will the market pay for these profits?. These can be seen as supply and demand sides what underlies the supply (of stock), and what drives the (market) demand for stock?

6.2 STOCK VALUATION CRITERIA

Fundamental criteria (fair value)

The most theoretically sound stock valuation method, called income valuation or the discounted cash flow (DCF) method, involves discounting of the profits (dividends, earnings, or cash flows) the stock will bring to the stockholder in the foreseeable future, and a final value on disposal.[1] The discounted rate normally includes a risk premium which is commonly based on the capital asset pricing model.

Stock Valuation Methods

Stocks have two types of valuations. One is a value created using some type of cash flow, sales or fundamental earnings analysis. The other value is dictated by how much an investor is willing to pay for a particular share of stock and by how much other investors are willing to sell a stock for (in other words, by supply and demand). Both of these values change over time as investors change the way they analyze stocks and as they become more or less confident in the future of stocks.

Check your Progress
1. What is Stock Valuation?

The fundamental valuation is the valuation that people use to justify stock prices. The most common example of this type of valuation methodology is P/E ratio, which stands for Price to Earnings Ratio. This form of valuation is based on historic ratios and statistics and aims to assign value to a stock based on measurable attributes. This form of valuation is typically what drives long-term stock prices.

The other way stocks are valued is based on supply and demand. The more people that want to buy the stock, the higher its price will be. And conversely, the more people that want to sell the stock, the lower the price will be. This form of valuation is very hard to understand or predict, and it often drives the short-term stock market trends.

There are many different ways to value stocks. The key is to take each approach into account while formulating an overall opinion of the stock. If the valuation of a company is lower or higher than other similar stocks, then the next step would be to determine the reasons.

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Earnings Per Share (EPS). EPS is the total net income of the company divided by the number of shares outstanding. The most important thing to look for in the EPS figure is the overall quality of earnings. Make sure the company is not trying to manipulate their EPS numbers to make it look like they are more profitable. Also, look at the growth in EPS over the past several quarters / years to understand how volatile their EPS is, and to see if they are an underachiever or an overachiever. In other words, have they consistently beaten expectations or are they constantly restating and lowering their

By doing your fundamental investment research you'll be able to arrive at your own EPS forecasts, which you can then apply to the other valuation techniques below.

Price to Earnings (P/E). Now that you have several EPS figures (historical and forecasts), you'll be able to look at the most common valuation technique used by analysts, the price to earnings ratio, or P/E. To compute this figure, take the stock price and divide it by the annual EPS figure. Historical P/Es are computed by taking the current price divided by the sum of the EPS for the last four quarters, or for the previous year.

Growth Rate. Valuations rely very heavily on the expected growth rate of a company. One must look at the historical growth rate of both sales and income to get a feeling for the type of future growth expected. However, companies are constantly changing, as well as the economy, so solely using historical growth rates to predict the future is not an acceptable form of valuation. Instead, they are used as guidelines for what future growth could look like if similar circumstances are encountered by the company. Calculating the future growth rate requires personal investment research. This may take form in listening to the company's quarterly conference call or reading press release or other company article that discusses the company's growth guidance.

And for any valuation technique, it's important to look at a range of forecast values. For example, if the company being valued has been growing earnings between 5 and 10% each year for the last 5 years, but believes that it will grow 15 - 20% this year, a more conservative growth rate of 10 - 15% would be appropriate in valuations.

Price Earnings to Growth (PEG) Ratio. This valuation technique has really become popular over the past decade or so. It is better than just looking at a P/E because it takes three factors into account: the price, earnings, and earnings growth rates. To compute the PEG ratio, divide the Forward P/

E by the expected earnings growth rate (you can also use historical P/E and historical growth rate to see where it's traded in the past). This will yield a ratio that is usually expressed as a percentage. The theory goes that as the percentage rises over 100% the stock becomes more and more overvalued, and as the PEG ratio falls below 100% the stock becomes more and more undervalued. Here's an example of how to use the PEG ratio. Say you are comparing two stocks that you are thinking about buying. Stock A is trading at a forward P/E of 15 and expected to grow at 20%. Stock B is trading at a forward P/E of 30 and expected to grow at 25%. The PEG ratio for Stock A is 75% (15/20) and for Stock B is 120% (30/25). According to the PEG ratio, Stock A is a better purchase because it has a lower PEG ratio, or in other words, you can purchase its future earnings growth for a lower relative price than that of Stock B.

Nerbrand Z. Given that investments are subject to revisions of future expectations the Nerbrand Z utilises uncertainty of consensus estimates to assess how much earnings forecasts can be revised in standard deviation terms before P/E rations return to normalised levels. This calculation is best done with I/B/E/S consensus estimates. The market tend to focus on the 12 month forward P/E level but this ratio is dependent on earnings estimates which are never homogenous. Hence there is a standard deviation of 12 month forward earnings estimates.

The Nerbrand z is therefore expressed as

$$Z = \frac{\frac{P}{H[P/E]} - E12}{stdev(E12)}$$

where

H[P/E] = normalised P/E, e.g. a 5 year historical average of 12 month forward P/E ratios.

E12 = mean 12 month forward earnings estimates

stdev(E12) = standard deviation of 12 month forward earnings estimates.

A negative number indicates that earnings can be downgraded before valuations normalise. As such, a negative number indicate a valuation adjusted earnings buffer. For example, if the 12 month forward mean EPS forecast is \$10, the price of the equity is \$100, the historical average P/E ratio is 15, the standard deviation of EPS forecast is 2 then the Nerbrand Z is -1.67. That is, 12 month forward consensus earnings estimates could be downgraded by 1.67 standard deviation before P/E ratio would go back to 15.

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Return on Invested Capital (ROIC). This valuation technique measures how much money the company makes each year per dollar of invested capital. Invested Capital is the amount of money invested in the company by both stockholders and debtors. The ratio is expressed as a percent and you should look for a percent that approximates the level of growth that you expect. In its simplest definition, this ratio measures the investment return that management is able to get for its capital. The higher the number, the better the return.

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Return on Assets (ROA). Similar to ROIC, ROA, expressed as a percent, measures the company's ability to make money from its assets. To measure the ROA, take the pro forma net income divided by the total assets. However, because of very common irregularities in balance sheets (due to things like Goodwill, write-offs, discontinuations, etc.) this ratio is not always a good indicator of the company's potential. If the ratio is higher or lower than you expected, be sure to look closely at the assets to see what could be over or understating the figure.

Price to Sales (P/S). This figure is useful because it compares the current stock price to the annual sales. In other words, it tells you how much the stock costs per dollar of sales earned. To compute it, take the current stock price divided by the annual sales per share. The annual sales per share should be calculated by taking the net sales for the last four quarters divided by the fully diluted shares outstanding (both of these figures can be found by looking at the press releases or quarterly reports). The price to sales ratio is useful, but it does not take into account any debt the company has. For example, if a company is heavily financed by debt instead of equity, then the sales per share will seem high (the P/S will be lower). All things equal, a lower P/S ratio is better. However, this ratio is best looked at when comparing more than one company.

Market Cap. Market Cap, which is short for Market Capitalization, is the value of all of the company's stock. To measure it, multiply the current

stock price by the fully diluted shares outstanding. Remember, the market cap is only the value of the stock. To get a more complete picture, you'll want to look at the Enterprise Value.

Enterprise Value (EV). Enterprise Value is equal to the total value of the company, as it is trading for on the stock market. To compute it, add the market cap (see above) and the total net debt of the company. The total net debt is equal to total long and short term debt plus accounts payable, minus accounts receivable, minus cash. The Enterprise Value is the best approximation of what a company is worth at any point in time because it takes into account the actual stock price instead of balance sheet prices[citation needed]. When analysts say that a company is a "billion dollar" company, they are often referring to its total enterprise value. Enterprise Value fluctuates rapidly based on stock price changes.

EV to Sales. This ratio measures the total company value as compared to its annual sales. A high ratio means that the company's value is much more than its sales. To compute it, divide the EV by the net sales for the last four quarters. This ratio is especially useful when valuing companies that do not have earnings, or that are going through unusually rough times. For example, if a company is facing restructuring and it is currently losing money, then the P/E ratio would be irrelevant. However, by applying a EV to Sales ratio, you could compute what that company could trade for when its restructuring is over and its earnings are back to normal.

EBITDA. EBITDA stands for earnings before interest, taxes, depreciation and amortization. It is one of the best measures of a company's cash flow and is used for valuing both public and private companies. To compute EBITDA, use a companies income statement, take the net income and then add back interest, taxes, depreciation, amortization and any other non-cash or one-time charges. This leaves you with a number that approximates how much cash the company is producing. EBITDA is a very popular figure because it can easily be compared across companies, even if all of the companies are not profitable.

EV to EBITDA. This is perhaps one of the best measurements of whether or not a company is cheap or expensive To compute, divide the EV by EBITDA (see above for calculations). The higher the number, the more expensive the company is. However, remember that more expensive companies are often valued higher because they are growing faster or because they are a higher

quality company. With that said, the best way to use EV/EBITDA is to compare it to that of other similar companies.

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6.3 VALUATION

Firms obtain their long-term sources of equity financing by issuing common and preferred stock. The payments of the firm to the holders of these securities are in the form of dividends. Unlike interest payments on debt which are tax deductible, dividends must be paid out of after-tax income.

The common stockholders are the owners of the firm. They have the right to vote on important matters to the firm such as the election of the Board of Directors. Preferred stock, on the other hand, is a hybrid form of financing, sharing some features with debt and some with common equity. For example, preferred dividends like interest payments on debt are generally fixed. In addition, the claims against the assets of the firm of the preferred stockholders, like those of the debt holders, are also fixed.

The common stockholders have a residual claim against the assets and cash flows of the firm. That is, the common stockholders have a claim against whatever assets remain after the debt holders and preferred stockholders have been paid. Moreover, the cash flow that remains after interest and preferred dividends have been paid belongs to the common stockholders.

The priority of the claims against the assets of the firm belonging to debt holders, preferred stockholders, and common stockholders differ. The owners of the firm's debt securities have the first claim against the assets of the firm. This means that the debt holders must receive their scheduled interest and principal payments before any dividends can be paid to the equity holders. If these claims are not paid, the debt holders can force the firm into bankruptcy. The preferred stockholders have the next claim. They must be paid the full amount of their scheduled dividends before any dividends may be distributed to the common stockholders.

The value of these securities, as with other assets, is based upon the discounted value of their expected future cash flows. In this section, Time Value of Money principles are applied to value common and preferred stock. Two approaches are presented for the valuation of common stock. The first approach illustrates the valuation of a constant growth stock, *i.e.*, a stock whose dividends are growing at a rate which mirrors the long-term growth rate of the economy. The second approach is a more general approach which can be applied to value stocks whose growth is not constant in the near term.

OVERVIEW *The process of determining security valuation involves finding the present value of an asset's expected future cash flows using the investor's required rate of return.*

Security valuation model:

$$V = \sum_{t=1}^{n} \frac{C_t}{(1+r)^t}$$

where V = intrinsic value or present value of a security

C_t = expected future cash flows in period t = 1, ..., n

r = the investor's required rate of return

Common stock valuation: the present value of all future cash inflows expected to be received by the investor comprising of dividends and future selling price.

Single holding period: For an investor holding a common stock for only 1 year, the value of the stock would be the present value of both the expected cash dividend to be received in 1 year (D_1) and the expected market price per share of the stock at year end (P_1). If r represents an investor's required rate of return, the value of common stock (P_0) would be:

$$P_0 = \frac{D_1}{(1+r)^1} + \frac{P_1}{(1+r)^1}$$

Exercise :

Softstar Ltd. is expected to declare a dividend of Rs. 3.00 per share and its price at the end of the year is expected to be Rs. 48. Compute the market price of the share if the required rate of return is 9%.

Mercury India Ltd. is expected to declare a dividend of Rs.2.50 and reach a price of Rs.35.00 a year hence. What is the price at which the share would be sold to the investors now if the required rate of return is 13 percent?

Solution

$$P_0 = \frac{D_1}{(1+r)^1} + \frac{P_1}{(1+r)^1}$$

$$= 2.21 + 31.00$$

$$= \text{Rs.}33.21$$

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$$P_0 = \sum_{t=1} \frac{D_t}{(1+r)^t}$$

where D_t = dividend in period t.

· The model is based on the concept that a common stock is worth the present value of future dividends. However, future dividends may grow with three different patterns: zero growth, constant growth, or nonconstant (super-normal) growth.

Zero growth model: If dividends are expected to remain unchanged, then the above model reduces to the formula:

$$P_0 = \frac{D}{r}$$

· This is the case with a perpetuity. This model is most applicable to the valuation of preferred stocks or the common stocks of very mature companies such as municipal utilities.

Constant growth model: If dividends grow at a constant rate of g every year [i.e., $D_t = D_0(1 + g)^t$], then the general model is simplified to:

$$P_0 = \frac{D_1}{r - g}$$

- This formula, known as the Gordon's dividend growth model, is most applicable to the valuation of the common stock of vary large or broadly diversified companies.
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$$P_0 = \frac{D_0(1+g)}{r-g} = \frac{D_1}{r-g}$$

ere

- P_0 = the stock price at time 0,

D_0 = the current dividend,

D_1 = the next dividend (*i.e.*, at time 1),

g = the growth rate in dividends, and

r = the required return on the stock, and

$g < r$.

Constant Growth Stock Valuation Example

Find the stock price given that the current dividend is Rs.2 per share, dividends are expected to grow at a rate of 6% in the forseeable future, and the required return is 12%.Solution:

$$P_1 = \frac{2(1+.06)}{.12-.06} = \$35.33$$

Nonconstant, or supernormal, growth model: Firms typically go through life cycles, during part of which their growth is faster than that of the economy and then falls sharply.

· The value of stock during such supernormal growth can be found by taking the following steps: (1) Compute the dividends during the period of supernormal growth and find their present value; (2) find the price of the stock at the end of the supernormal growth period and compute its present value; and (3) add these two present value figures to find the value (Po) of the common stock.

The value of a non-constant growth stock can be determined using the following equation:

$$P_0 = \sum_{t=1}^{T} \frac{D_T}{(1+r)^t} + \left(\frac{D_{T+1}}{r - g_c}\right)(1+r)^{-T}$$

where

- P_0 = the stock price at time 0,
- D_t = the expected dividend at time t,
- T = the number of years of nonconstant growth,
- g_c = the long-term constant growth rate in dividends, and
- r = the required return on the stock, and

$g_c < r$.

Non-constant Growth Stock Valuation Example

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Check your Progress

2. What is EPS?
3. What is P/E Ratio?

The current dividend on a stock is $2 per share and investors require a rate of return of 12%. Dividends are expected to grow at a rate of 20% per year over the next three years and then at a rate of 5% per year from that point on. Find the price of the stock.Solution:There are 3 years of non constant growth, thus, T = 3. Before substituting into the formula given above it is necessary to calculate the expected dividends for years 1 through 4 using the provided growth rates.

$$D_1 = 2(1+.20) = \$2.40$$
$$D_2 = 2.40(1+.20) = \$2.88$$
$$D_3 = 2.88(1+.20) = \$3.456$$
$$D_4 = 3.456(1+.05) = \$3.6288$$

$$P_0 = \frac{2.40}{(1+.12)^1} + \frac{2.88}{(1+.12)^2} + \frac{3.456}{(1+.12)^3} + \frac{3.6288}{.12-.05}(1+.12)^{-3} = \$43.80$$

Price earnings ratio a pragmatic approach: forecasted price at the end of year = estimated EPS in year t x estimated P/E ratio.

6.4 OTHER APPROACHES TO VALUATION OF EQUITIES

A] Dividend Capitalisation Approach:

The intrinsic value (P0) of the stock paying a dividend 'D' and the expected price of 'P1' and the required rate of return 'Rr' is given by P0 = (D+ P1)/(1+Rr)

Therefore from the above formula, we can derive the required rate of return (Rr) as

Rr = (D/P0) + g

where (D/P0) is called as Dividend Yield.

The expected price 'P0' of the equity share which has a price growth of 'g' and the required rate of return 'Rr' is given by P0 = D/(Rr-g)

Example 1:

The dividend per share of ABC Ltd. is Rs.5.00. It is expected to grow at a rate of 4% per year. What is the expected rate of return for the investor when the current market rate of the share is Rs.50

Rr = (5/50) + 4%

i.e. 10% + 4% = 14%

In case of companies having the Earnings as the only source of income, then the required rate of return is given by

Intrinsic Value = (Earning per share * Dividend payout ratio) * 100

(Discount rate - Growth rate)

Example 2

What is the intrinsic value per share of scrip XYZ Ltd. given the following ?

Earning per share = Rs.3.00

Dividend payout ratio = 0.6

Discount rate = 15%

Growth rate = 6%

Solution:

Intrinsic Value = (Earning per share * Dividend payout ratio) * 100

(Discount rate - Growth rate)

= (3.00 * 0.6)*100 / (15 - 6) = Rs.20

Earning per share & Price-earnings Approach

The other approach used in financial analysis is the Price-Earnings (P/E) ratio approach, the value as per the P/E approach is given by

Value = Earning per share (EPS) * Price Earnings ratio

where EPS = (profit after Tax / no. of equity shares outstanding)

P/E = (Market Price of the share / EPS)

Example:

What is the Price-Earnings ratio of the company if the Profit after tax is Rs.100 crore. The current market rate of the share is Rs.250 /-

EPS = (PAT - Preference Dividend)/ Issue capital

= (Rs.100 Cr. - Rs.10 Cr.)/ 90 lakh shares

= 100

Therefore, P/E = Market Price/EPS

= Rs.250 / 100

= 2.5

Book Value Approach:

Book value per share of a company is

Book Value = (net worth of the company / no. of shares outstanding)

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where net worth includes equity capital of the company, reserves and surplus. The intrinsic value thus arrived may vary due to the accounting policy followed by the company.

Example:

What is the book value of the firm having a net worth of Rs.2500 crore and the number of shares outstanding is 50 crore?

Intrinsic Book Value = Rs.2500 crore / 50 crore

= Rs.50

Liquidation Value of the Share Approach :

The value of the shares on liquidation of the company is the company is calculated after deducting the amount to be paid to the creditors & the preference shareholders.

Thus the value of the share is given by

Value = (Liquidation value of the company - Amount paid to be the creditors & preference shareholders) / no. of equity shares outstanding.

Example:

What is the book value of the firm having a net worth of Rs.2500 crore and the number of shares outstanding is 50 crore?

Intrinsic Book Value = Rs.2500 crore / 50 crore

= Rs.50

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Thus the value of the share is given by

Value = (Liquidation value of the company - Amount paid to be the creditors & preference shareholders) / no. of equity shares outstanding.

Example:

The company XYZ LTD. is liquidated realizing Rs.10 crore from liquidation of it assets. The company had to pay Rs.1 crore to the creditors. What is the value of the shares, if the total outstanding number of share is 45 lakh.

Value of each share = (Rs.10 crore - Rs.1 crore)/ 45 lakh share

= Rs.20

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6.5 PREFERRED STOCK VALUATION

Peferred stock is defined as equity with priority over common stock with respect to the payment of dividends and the distribution of assets in a liquidation. Preferred stock is a hybrid security which shares features with both common stock and debt.

Preferred stock is similar to common stock in that it entitles its owners to receive dividends which the firm must pay out of after-tax income. Moreover, the use of preferred stock as a source of financing does not increase the probability of bankruptcy for the firm.

However, like the coupon payments on debt, the dividends on preferred stock are generally fixed. Also, the claims of the preferred stockholders against the assets of the firm are fixed as are the claims of the debtholders.

Preferred stock has the following features:

Check your Progress

4. What is Constant Growth Model?
5. What is Equity Research?

Par Value

The par value represents the claim of the preferred stockholder against the value of the firm.

Preferred Dividend / Preferred Dividend Rate

The preferred dividend rate is expressed as a percentage of the par value of the preferred stock. The annual preferred dividend is determined by multiplying the preferred dividend rate times the par value of the preferred stock.

Since the preferred dividends are generally fixed, preferred stock can be valued as a constant growth stock with a dividend growth rate equal to zero. Thus, the price of a share of preferred stock can be determined using the following equation:

$$P_p = \frac{D_p}{r}$$

where

P_p = the preferred stock price,

D_p = the preferred dividend, and

r = the required return on the stock.

6.6 PREFERRED STOCK VALUATION EXAMPLE

Find the price of a share of preferred stock given that the par value is \$100 per share, the preferred dividend rate is 8%, and the required return is 10%.Solution:

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Solution:

$$P_p = \frac{.08 * 100}{.10} = \frac{8}{.10} = \$80$$

Constant Growth Stock Price: $P_0 = \frac{D_0(1+g)}{r-g} = \frac{D_1}{r-g}$

Expected Return: $r = \frac{D_1}{P_0} + g$

Nonconstant Growth Stock: $P_0 = \sum_{t=1}^{T} \frac{D_T}{(1+r)^t} + \left(\frac{D_{T+1}}{r-g_c}\right)(1+r)^{-T}$

Preferred Stock: $P_p = \frac{D_p}{r}$

6.7 WHAT IS EQUITY RESEARCH?

Equity research is what an equity research analyst does.

Well, to start with, equity research is a study of equities or stocks for the purpose of investments.

Equities or common stock comprises a big chunk in any company's capital and shareholders need to know whether to stay invested in the company or sale the shares and come out.

As an individual, it is time consuming to do equity research – that is to study the company, its financial statements, products, management and take a decision about investment.

Exactly for the same reason there are people working in research companies whose job is to do equity research and recommend companies for investment.

6.8 LIMITATIONS OF THE ABOVE VALUATION MODEL

It is important to appreciate that there are a number of problems and specific assumptions in this model.

(a) Anticipated values for dividends and prices - all of the dividends and prices used in the model are the investor's estimates of the future.

(b) Assumption of investor rationality - the model assumes investors act rationally and make their decisions about share transactions on the basis of financial evaluation.

(c) Application of discounting - it assumes that the conventional compound interest approach equates cash flows at different points in time.

(d) Share prices are ex div

(e) Dividends are paid annually with the next dividend payable in one year.

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6.9 ANSWERS TO CHECK YOUR PROGRESS

1. Calculating theoretical values of companies and their stock to predict the future market prices.
2. The Earnings of the Equity Shares are expressed on per share basis by calculating Profit After Tax and Preference Dividend divided by Number of equity shares outstanding.
3. It is the relationship exists between the Market Price of Equity Share and the Earnings Per Share.
4. Constant growth stock is a stock those dividends are expected to grow at a constant rate in the foreseeable future.
5. Equity Research is a study of equities or stock for the purpose of making investments.

6.10 REVIEW QUESTIONS

1. How do you estimate intrinsic value of share which is held for one year?
2. Illustrate two stage growth model of share valuation with an example.
3. Describe various ways of valuation of equity stock.
4. Explain the concept of present value.

6.11 REFERENCES

1. COMMON STOCK PERFORMANCE AND INFLATION: AN INTERNATIONAL COMPARISION: Journal of Political Economy, P 48-52.
2. INVESTMENT ANALYLSIS AND PORTFOLIO MANAGEMENT – Prasanna Chandra – Tata Mc Graw Hill.+
3. PORTFOLIO MANAGEMENT – Baruna S..K. and V. Raghunathan, J.R. Varma, Tata Mcgrawhill.
4. PORTFOLIO MANAGEMENT – S. Kevin
5. SECURITY ANALYUSIS AND PORTFOLIO MANAGEMENT - S. Kevin
    1. SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT – M. Renganatham and R. Madhumathi
    2. www. Mbaknowledgebase.com

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VALUATION OF BONDS

UNIT STRUCTURE

7.1 INTRODUCTION
7.2. BASIC VALUATION MODEL
7.3. BOND VALUATION
7.4. YIELD TO MATURITY
7.5. YIELD TO CALL
7.6 BASIC VALUATION OF BONDS
7.7 PRESENT VALUE OF AN ORDINARY ANNUITY TABLE
7.8 ADDITIONAL BOND TERMINOLOGY
7.9 ANSWERS TO CHECK YOUR PROGRESS
7.10 REVIEW QUESTIONS
7.11 REFERENCES

UNIT OBJECTIVES

1. To study the computation of bond prices and yield
2. To understand valuation of debt instruments
3. To recognize the measurement of return on bonds
4. To identify the present value of bond calculations

7.1 INTRODUCTION

Valuation is the process that establishes the link between the risk and return to find the value or worth of an asset. The inputs required for basic valuation are:

1. The expected returns in terms of cash flows with their respective timings of occurrence.
2. Risk in terms of the required return

The expected returns can either be annual or intermittent or sometimes even for once

7.2. BASIC VALUATION MODEL:

The basic value of an asset or a security is the sum of discounted value of all the future expected cash flows. The discount rate is the rate used as the required rate of return which is dependent upon the level of risk. If the investment in the asset is very risky, higher would be the discount rate. If the investment in the asset is less risky, lower would be the discount rate. To sum

up, the value of an asset is the present value of all the future expected cash flows discounted at the required rate of return. Symbolically, the Value of an asset (V) =

$$V = \frac{CF_1}{(1+r)^1} + \frac{CF_2}{(1+r)^2} + \dots\dots\dots\dots\dots\dots \frac{CF_n}{(1+r)^n}$$

CF = Cash flows expected at the respective year-ends

r = Discount rate (required rate of return)

n = The last period of cash flow occurrence

Bond valuation is the determination of the fair price of a bond. As with any security or capital investment, the theoretical fair value of a bond is the present value of the stream of cash flows it is expected to generate. Hence, the value of a bond is obtained by discounting the bond's expected cash flows to the present using an appropriate discount rate. In practice, this discount rate is often determined by reference to similar instruments, provided that such instruments exist.

7.3. BOND VALUATION

Bonds are long-term debt securities that are issued by corporations and government entities. Purchasers of bonds receive periodic interest payments, called coupon payments, until maturity at which time they receive the face value of the bond and the last coupon payment. Most bonds pay interest semi-annually. The *Bond Indenture* or *Loan Contract* specifies the features of the bond issue. The following terms are used to describe bonds.

Par or Face Value : The par or face value of a bond is the amount of money that is paid to the bondholders at maturity. For most bonds the amount is Rs.1000. It also generally represents the amount of money borrowed by the bond issuer.

Coupon Rate : The coupon rate, which is generally fixed, determines the periodic coupon or interest payments. It is expressed as a percentage of the bond's face value. It also represents the interest cost of the bond issue to the issuer.

Coupon Payments : The coupon payments represent the periodic interest payments from the bond issuer to the bondholder. The annual coupon payment is calculated be multiplying the coupon rate by the bond's face value. Since most bonds pay interest semiannually, generally one half of the annual coupon is paid to the bondholders every six months.

NOTES

Maturity Date : The maturity date represents the date on which the bond matures, i.e., the date on which the face value is repaid. The last coupon payment is also paid on the maturity date.

Original Maturity : The time remaining until the maturity date when the bond was issued.

Remaining Maturity : The time currently remaining until the maturity date.

Call Date

For bonds which are callable, i.e., bonds which can be redeemed by the issuer prior to maturity, the call date represents the date at which the bond can be called.

Call Price

The amount of money the issuer has to pay to call a callable bond. When a bond first becomes callable, i.e., on the call date, the call price is often set to equal the face value plus one year's interest.

Required Return

The rate of return that investors currently require on a bond.

Yield to maturity

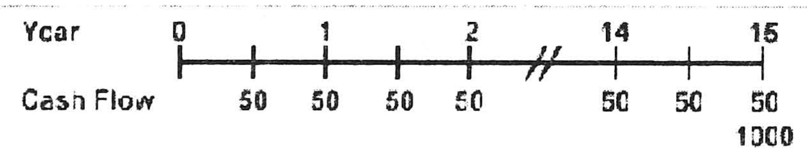
The rate of return that an investor would earn if he bought the bond at its current market price and held it until maturity. Alternatively, it represents the discount rate which equates the discounted value of a bond's future cash flows to its current market price.

Yield to call

The rate of return that an investor would earn if he bought a callable bond at its current market price and held it until the call date given that the bond was called on the call date.

The box below illustrates the cash flows for a semiannual coupon bond with a face value of Rs.1000, a 10% coupon rate, and 15 years remaining until maturity. (Note that the annual coupon is $100 which is calculated by multiplying the 10% coupon rate times the Rs1000 face value. Thus, the periodic coupon payments equal Rs50 every six months.)

Bond Cash Flows



Because most bonds pay interest semiannually, the discussion of Bond Valuation presented here focuses on semiannual coupon bonds. However, the corresponding equations for annual coupon bonds are provided on the Bond Equations page

Bond Price

The price or value of a bond is determined by discounting the bond's expected cash flows to the present using the appropriate discount rate. This relationship is expressed for a semiannual coupon bond by the following formula:

where

Find the price of a semiannual coupon bond with a face value of Rs.1000, a 10% coupon rate, and 15 years remaining until maturity given that the required return is 12%.

Solution:

$$B_0 = \frac{100}{2}\left[\frac{1-\left(1+\frac{.12}{2}\right)^{-2(15)}}{\frac{.12}{2}}\right] + \frac{1000}{\left(1+\frac{.12}{2}\right)^{2(15)}} = \$862.35$$

7.4. YIELD TO MATURITY

Yield to Maturity

The yield to maturity on a bond is the rate of return that an investor would earn if he bought the bond at its current market price and held it until maturity. It represents the discount rate which equates the discounted value of a bond's future cash flows to its current market price. This is illustrated by the following equation:

$$B_0 = \frac{C}{2}\left[\frac{1-\left(1+\frac{YTM}{2}\right)^{-2t}}{\frac{YTM}{2}}\right] + \frac{F}{\left(1+\frac{YTM}{2}\right)^{2t}}$$

where

B_0 = the bond price,

C = the annual coupon payment,

F = the face value of the bond,

YTM = the yield to maturity on the bond, and

t = the number of years remaining until maturity.

NOTES

The yield to maturity usually cannot be solved for directly. It generally must be determined using trial and error or an iterative technique. Fortunately, financial calculators make the task of solving for the yield to maturity quite simple.

Find the yield to maturity on a semiannual coupon bond with a face value of Rs.1000, a 10% coupon rate, and 15 years remaining until maturity given that the bond price is Rs.862.35.

Solution

$$\$862.35 = \frac{100}{2}\left[\frac{1-\left(1+\frac{YTM}{2}\right)^{-2(15)}}{\frac{YTM}{2}}\right] + \frac{1000}{\left(1+\frac{YTM}{2}\right)^{2(15)}}$$

$$\therefore YTM = 12\%$$

7.5. YIELD TO CALL

Yield to Call

Check your Progress

1. What is Yield to Maturity?
2. What is Yield to call?

Many bonds, especially those issued by corporations, are *callable*. This means that the issuer of the bond can redeem the bond prior to maturity by paying the *call price*, which is greater than the face value of the bond, to the bondholder. Often, callable bonds cannot be called until 5 or 10 years after they were issued. When this is the case, the bonds are said to be *call protected*. The date when the bonds can be called is refered to as the *call date*.

The yield to call is the rate of return that an investor would earn if he bought a callable bond at its current market price and held it until the call date given that the bond was called on the call date. It represents the discount rate which equates the discounted value of a bond's future cash flows to its current market price given that the bond is called on the call date. This is illustrated by the following equation:

where

B_0 = the bond price,

C = the annual coupon payment,

CP = the call price,

YTC = the yield to call on the bond, and

CD = the number of years remaining until the call date.

Like the yield to maturity, the yield to call usually cannot be solved for directly. It generally must be determined using trial and error or an iterative technique. Fortunately, financial calculators make the task of solving for the yield to maturity quite simple.

Find the yield to call on a semiannual coupon bond with a face value of \$1000, a 10% coupon rate, 15 years remaining until maturity given that the bond price is \$1175 and it can be called 5 years from now at a call price of \$1100.

Solution:

$$\$1175 = \frac{100}{2}\left[\frac{1-\left(1+\frac{YTC}{2}\right)^{-2(5)}}{\frac{YTC}{2}}\right] + \frac{1100}{\left(1+\frac{YTC}{2}\right)^{2(5)}}$$

$\therefore YTC = 7.43\%$

7.6 BASIC VALUATION OF BONDS

1. Introduction to Bonds Payale

Bonds are a form of long-term debt. You might think of a bond as an IOU issued by a corporation and purchased by an investor for cash. The corporation issuing the bond is borrowing money from an investor who becomes a lender and bondholder.

A bond is a formal contract that requires the issuing corporation to pay the bondholders

1. Interest every six months based on the bond's stated interest rate, and
2. The principal or face amount on the bond's maturity date.

There are two significant advantages for a corporation to issue bonds instead of common stock:

1. Bonds will not dilute the ownership interest of the stockholders, and
2. Bonds have a lower cost than common stock.

Present value calculations are used to determine a bond's market value and to calculate the true or effective interest rate paid by the corporation and earned by the investor. Present value calculations discount a bond's fixed cash payments of interest and principal by the market interest rate for the bond.

2. Bond Interest and Principal Payments

When a corporation issues a bond, it promises to pay the bondholder

1. Interest every six months at the bond's stated interest rate, and
2. The principal or face amount when the bond comes due at its maturity date.

Bond Interest Payments

Normally, a bond's interest payments occur semiannually. This means that the corporation issuing a bond will pay to the bondholders one-half of the annual interest at the end of each six-month period as long as the bond is outstanding. The formula for calculating the *semiannual interest payments* is:

Face Amount of the Bond x Stated Annual Interest Rate x 6/12 of a Year

The following terms mean the same as a bond's *stated* interest rate:

- *face* interest rate
- *nominal* interest rate
- *coupon* interest rate
- *contractual* interest rate

Throughout our explanation of bonds payable we will use the term stated interest rate or stated rate. Usually a bond's stated interest rate is fixed or locked-in for the life of the bond.

Bond Principal Payment

A bond's principal payment is the dollar amount that appears on the face of a bond. This is the amount that the issuing corporation must pay to the bondholders on the date that a bond matures or comes due. Here are some names that refer to a bond's *principal amount*:

- *face* value
- *par* or par value
- *maturity* value or maturity amount
- *stated* value

Throughout our explanation we will use these terms interchangeably. In addition, we assume that the bond's principal amount will be due on a single date.

Timeline for Interest and Principal Payments

It is helpful to prepare a timeline to visualize the cash payments that a corporation promises to pay its bondholders. The following timeline presents the cash payments of interest and principal for a 9% $100,000 bond maturing in 5 years:

Interest:	$4,500	$4,500	$4,500	$4,500	$4,500	$4,500
Principal:						$100,000
					.....	
	? 6 months?	? 6 months?	? 6 months?	? 6 months?		? 6 months?
0 Period No.	1	2	3	4	9	10

As the timeline indicates, the corporation will pay its bondholders 10 semiannual interest payments of $4,500

($100,000 x 9% x 6/12 of a year). Each of the interest payments occurs at the end of each of the 10 six-month time periods. When the bond matures at the end of the 10th six-month period, the corporation must make the $100,000 principal payment to its bondholders.

Keep in mind that a bond's stated cash amounts—the ones shown in our timeline—will not change during the life of the bond. Calculating the Present Value of a 9% Bond in an 8% Market The present value of a bond is calculated by discounting the bond's future cash payments by the current *market interest rate.*

In other words, the present value of a bond is the total of:

1. The present value of the semiannual interest payments,

PLUS

2. The present value of the principal payment on the date the bond matures.

A 9% $100,000 bond dated January 1, 2010 and having interest payment dates of June 30 and December 31 of each year for five years will have the following semiannual interest payments and the one-time principal payment:

Interest:	Rs.4,500	$4,500	$4,500	$4,500	$4,500	$4,500
Principal:						$100,000
					.....	
	? 6 months?	? 6 months?	? 6 months?	? 6 months?		? 6 months?
01/01/10	06/30/10	12/31/10	06/30/11	12/31/11	6/30/14	12/31/14
0 Period No.	1	2	3	4	9	10

NOTES

Check your Progress

3. State the use of time lines.

NOTES

As the timeline indicates, the issuing corporation will pay its bondholders 10 identical interest payments of $4,500 ($100,000 x 9% x 6/12 of a year) at the end of each of the 10 semiannual periods, plus a single principal payment of $100,000 at the end of the 10th six-month period.

The present value (and the market value) of this bond depends on the *market interest rate* at the time of the calculation. The market interest rate is used to discount both the bond's future interest payments and the principal payment occurring on the maturity date.

The present value of a bond =

1. The present value of a bond's interest payment,

PLUS

2. The present value of a bond's maturity amount.

Always use the *market interest rate* to discount the bond's interest payments and maturity amount to their *present value*.

1. Present Value of a Bond's Interest Payments

In our example, there will be interest payments of $4,500 occurring at the end of every six-month period for a total of 10 six-month or semiannual periods. This series of identical interest payments occurring at the end of equal time periods forms an ordinary annuity.

To calculate the present value of the semiannual interest payments of $4,500 each, you need to discount the interest payments by the *market interest rate* for a six-month period. This can be done with computer software, a financial calculator, or a present value of an ordinary annuity (PVOA) table.

We will use present value tables with factors rounded to three decimal places and will round some dollar amounts to the nearest dollar. After you understand the present value concepts and calculations, use computer software or a financial calculator to compute more precise present value amounts.

We will use the Present Value of an Ordinary Annuity (PVOA) Table for our calculations:

7.7 PRESENT VALUE OF AN ORDINARY ANNUITY TABLE

Present Value Factors for an Ordinary Annuity (PVOA Factors) for 1.000 per Period.

Rounded to three decimal places.

NOTES

Example:

When interest is 6% per period and it is compounded each period, receiving 1.000 at the end of each period for 8 periods has a present value of 6.210.

Notice that the first column of the PVOA Table has the heading of "n". This column represents the number of identical payments and periods in the ordinary annuity. In computing the present value of a bond's interest payments, "n" will be the *number of semiannual interest periods or payments.*

n	1%	2%	3%	4%	5%	6%	8%	10%	12%
1	0.990	0.980	0.971	0.962	0.952	0.943	0.926	0.909	0.893
2	1.970	1.942	1.913	1.886	1.859	1.833	1.783	1.736	1.690
3	2.941	2.884	2.829	2.775	2.723	2.673	2.577	2.487	2.402
4	3.902	3.808	3.717	3.630	3.546	3.465	3.312	3.170	3.037
5	4.853	4.713	4.580	4.452	4.329	4.212	3.993	3.791	3.605
6	5.795	5.601	5.417	5.242	5.076	4.917	4.623	4.355	4.111
7	6.728	6.472	6.230	6.002	5.786	5.582	5.206	4.868	4.564
8	7.652	7.325	7.020	6.733	6.463	6.210	5.747	5.335	4.968
9	8.566	8.162	7.786	7.435	7.108	6.802	6.247	5.759	5.328
10	9.471	8.983	8.530	8.111	7.722	7.360	6.710	6.145	5.650
11	10.368	9.787	9.253	8.760	8.306	7.887	7.139	6.495	5.938
12	11.255	10.575	9.954	9.385	8.863	8.384	7.536	6.814	6.194
13	12.134	11.348	10.635	9.986	9.394	8.853	7.904	7.103	6.424
14	13.004	12.106	11.296	10.563	9.899	9.295	8.244	7.367	6.628
15	13.865	12.849	11.938	11.118	10.380	9.712	8.559	7.606	6.811
16	14.718	13.578	12.561	11.652	10.838	10.106	8.851	7.824	6.974
17	15.562	14.292	13.166	12.166	11.274	10.477	9.122	8.022	7.120
18	16.398	14.992	13.754	12.659	11.690	10.828	9.372	8.201	7.250
19	17.226	15.678	14.324	13.134	12.085	11.158	9.604	8.365	7.366
20	18.046	16.351	14.877	13.590	12.462	11.470	9.818	8.514	7.469
21	18.857	17.011	15.415	14.029	12.821	11.764	10.017	8.649	7.562
22	19.660	17.658	15.937	14.451	13.163	12.042	10.201	8.772	7.645
23	20.456	18.292	16.444	14.857	13.489	12.303	10.371	8.883	7.718
24	21.243	18.914	16.936	15.247	13.799	12.550	10.529	8.985	7.784
25	22.023	19.523	17.413	15.622	14.094	12.783	10.675	9.077	7.843
26	22.795	20.121	17.877	15.983	14.375	13.003	10.810	9.161	7.896
27	23.560	20.707	18.327	16.330	14.643	13.211	10.935	9.237	7.943
28	24.316	21.281	18.764	16.663	14.898	13.406	11.051	9.307	7.984
29	25.066	21.844	19.188	16.984	15.141	13.591	11.158	9.370	8.022
30	25.808	22.396	19.600	17.292	15.372	13.765	11.258	9.427	8.055

NOTES

The remaining columns are headed by interest rates. These interest rates represent the *market interest rate* for the period of time represented by "n". In the case of a bond, since "n" refers to the number of *semiannual interest periods*, you select the column with the *market interest rate per semiannual period*. For example, a 5-year bond paying interest semiannually will require you to go down the first column until you reach the row where n = 10. Since n = 10 *semiannual periods*, you need to go to the column which is headed with the *market interest rate per semiannual period*. If the market interest rate is 8% per year, you would go to the column with the heading of 4% (8% annual rate divided by 2 six-month periods). Go down the 4% column until you reach the row where n = 10. At the intersection of n = 10, and the interest rate of 4% you will find the appropriate PVOA factor of 8.111.

The factors contained in the PVOA Table represent the present value of a series or stream of $1 amounts occurring at the end of every period for "n" periods discounted by the market interest rate per period. We will refer to the market interest rates at the top of each column as "i".

To obtain the proper factor for discounting a bond's interest payments, use the column that has the *market's semiannual interest rate* "i" in its heading.

Let's use the following formula to compute the present value of the *interest payments only* as of January 1, 2010 for the bond described above. The amount of the interest payment occurring at the end of each six-month period is represented by "PMT", the number of semiannual periods is represented by "n" and the market interest rate per semiannual period is represented by "i".

PVOA = PMT x PVOA factor

PVOA = $4,500 x PVOA factor for n=10 semiannual periods,
i=4% market interest rate per semiannual period

PVOA = $4,500 x 8.111

PVOA = $36,500

The present value of Rs.36,500 tells us that an investor requiring an 8% per year return compounded semiannually would be willing to invest $36,500 on January 1, 2010 in return for 10 semiannual payments of $4,500 each— with the first payment occurring on June 30, 2010. The difference between the 10 future payments of $4.500 each and the present value of $36,500 equals $8.500 ($45,000 minus $36.500). This $8.500 return on an investment of

$36,500 gives the investor an 8% annual return compounded semiannually.

Recap

- Use the *market interest rate when discounting* a bond's semiannual interest payments.
- Convert the market interest rate per year to a *semiannual market interest rate*, i.
- Convert the number of years to be the *number of semiannual periods*, n.
- When using the present value tables, use the *semiannual market interest rate* (i) and the *number of semiannual periods* (n).

Recall that this calculation determined the present value of the stream of interest payments. The present value of the maturity amount will be calculated next.

2. Present Value of a Bond's Maturity Amount

The second component of a bond's present value is the present value of the principal payment occurring on the bond's maturity date. The principal payment is also referred to as the bond's maturity value or face value.

In our example, there will be a $100,000 principal payment on the bond's maturity date at the end of the 10th semiannual period. The single amount of $100,000 will need to be discounted to its present value as of January 1, 2010.

To calculate the present value of the single maturity amount, you discount the $100,000 by the semiannual market interest rate. We will use the Present Value of 1 Table (PV of 1 Table) for our calculations.

Notice that the first column of the PV of 1 Table has the heading of "n". This column represents the number of identical periods that interest will be compounded. In the case of a bond, "n" is the number *of semiannual interest periods or payments*. In other words, the number of periods for discounting the maturity amount is the same number of periods used for discounting the interest payments.

The remaining columns of the PV of 1 Table are headed by interest rates. The interest rate represents the *market interest rate* for the period of time represented by "n". In the case of a bond, since "n" refers to the number of *semiannual interest periods*, you select the column with the *market interest rate per semiannual period*. For example, a 5-year bond paying interest semi-

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annually will require you to go down the first column until you reach the row where n = 10. Since n = 10 *semiannual periods*, you need to go to the column which is headed with the *market interest rate per semiannual period.* If the market interest rate is 8% per year, you would go to the column with the heading of 4% (8% annual rate divided by 2 six-month periods). Go down the 4% column until you reach the row where n = 10. At the intersection of n = 10, and the interest rate of 4%, you will find the PV of 1 factor of 0.676.

The factors contained in the PV of 1 Table represent the present value of a single payment of $1 occurring at the end of the period "n" discounted by the market interest rate per period, which will be noted as "i".

To obtain the proper factor for discounting a bond's maturity value, use the PV of 1 table and use the same "n" and "i" that you used for discounting the semiannual interest payments.

Here's a Tip

Let's use the following formula to compute the present value of the *maturity amount only* of the bond described above. The maturity amount, which occurs at the end of the 10th six-month period, is represented by "FV" .

PV of 1 = FV x PV of 1 factor

PV of 1 = $100,000 x PV of 1 factor for n=10 semiannual periods,
i=4% market interest rate per semiannual period

PV of 1 = $100,000 x 0.676

PVOA = $67,600

The present value of $67,600 tells us that an investor requiring an 8% per year return compounded semiannually would be willing to invest $67,600 in return for a single receipt of $100,000 at the end of 10 semiannual periods of time. The difference between the present value of $67,600 and the single future principal payment of $100,000 is $32,400. This $32,400 return on an investment of $67,600 gives the investor an 8% annual return compounded semiannually.

Recap:

When calculating the present value of the maturity amount...

Use the *semiannual market interest rate (i)* and the *number of semiannual periods (n)* that were used to calculate the present value of the interest payments.

Combining the Present Value of a Bond's Interest and Maturity Amounts

Recall that the present value of a bond consisted of:

1. The present value of a bond's interest payment,

PLUS

2. The present value of a bond's maturity amount.

NOTES

The present value of the bond in our example is $36,500 + $67,600 = $104,100.

The bond's total present value of $104,100 should approximate the bond's market value.

It is reasonable that a bond promising to pay 9% interest will sell for more than its face value when the market is expecting to earn only 8% interest. In other words, the 9% bond will be paying $500 more semiannually than the bond market is expecting ($4,500 vs. $4,000). If investors will be receiving an additional $500 semiannually for 10 semiannual periods, they are willing to pay $4,100 more than the bond's face amount of $100,000. The $4,100 more than the bond's face amount is referred to as Premium on Bonds Payable, Bond Premium, Unamortized Bond Premium, or Premium.

Amortizing Bond Premium with the Effective Interest Rate Method

When a bond is sold at a premium, the amount of the bond premium must be amortized to interest expense over the life of the bond. In other words, the credit balance in the account Premium on Bonds Payable must be moved to the account Interest Expense thereby reducing interest expense in each of the accounting periods that the bond is outstanding.

The preferred method for amortizing the bond premium is the *effective interest rate method* or the *effective interest method.* Under the effective interest rate method the amount of interest expense in a given year will correlate with the amount of the bond's book value. This means that when a bond's book value decreases, the amount of interest expense will decrease. In short, the effective interest rate method is more logical than the straight-line method of amortizing bond premium.

Before we demonstrate the effective interest rate method for amortizing the bond premium pertaining to a 5-year 9% $100,000 bond issued in an 8% market for $104,100 on January 1, 2010, let's outline a few concepts:

1. The bond premium of $4,100 must be amortized to Interest Expense over the life of the bond. This amortization will cause the bond's book

NOTES

value to decrease from $104,100 on January 1, 2010 to $100,000 jus prior to the bond maturing on December 31, 2014.

2. The corporation must make an interest payment of $4,500 ($100,000 x 9% x 6/12) on each June 30 and December 31. This means that the Cash account will be credited for $4,500 on each interest payment date.
3. The effective interest rate method uses the *market interest rate* at the time that the bond was issued. In our example, the market interest rate on January 1, 2010 was 4% per semiannual period for 10 semiannual periods.
4. The effective interest rate is multiplied times the bond's book value at the start of the accounting period to arrive at each period's interest expense.
5. The difference between Item 2 and Item 4 is the amount of amortization.

The following table illustrates the effective interest rate method of amortizing the $4,100 premium on a corporation's bonds payable:

Please make note of the following points:

- Column B shows the interest payments required in the bond contract: The bond's stated rate of 9% per year divided by two semiannual periods = 4.5% per semiannual period times the face amount of the bond
- Column C shows the interest expense. This calculation uses the market interest rate at the time the bond was issued: The market rate of 8% per year divided by two semiannual periods = 4% semiannually.

· The interest expense in column C is the product of the 4% market interest rate per semiannual period times the book value of the bond at the start of the semiannual period. Notice how the interest expense is decreasing with the decrease in the book value in column G. This correlation between the interest expense and the bond's book value makes the effective interest rate method the preferred method.

NOTES

A	B	C	D	E	F	G
Date	Interest Payment Stated 4.5% x Face	Interest Expense Mkt 4% x Previous BV in G	Amortization Of Bond Premium C minus B	Balance In Bond Premium Account	Balance In Bonds Payable Account	Book Value of the Bonds F plus E
	Credit Cash	Debit Interest Expense	Debit Bond Premium			
Jan 1, 2010				$ 4,100	$ 100,000	$ 104,100
Jun 30, 2010	$ 4,500	$ 4,164	$ (336)	$ 3,764	$ 100,000	$ 103,764
Dec 31, 2010	$ 4,500	$ 4,151	$ (349)	$ 3,415	$ 100,000	$ 103,415
Jun 30, 2011	$ 4,500	$ 4,137	$ (363)	$ 3,052	$ 100,000	$ 103,052
Dec 31, 2011	$ 4,500	$ 4,122	$ (378)	$ 2,674	$ 100,000	$ 102,674
Jun 30, 2012	$ 4,500	$ 4,107	$ (393)	$ 2,281	$ 100,000	$ 102,281
Dec 31, 2012	$ 4,500	$ 4,091	$ (409)	$ 1,872	$ 100,000	$ 101,872
Jun 30, 2013	$ 4,500	$ 4,075	$ (425)	$ 1,447	$ 100,000	$ 101,447
Dec 31, 2013	$ 4,500	$ 4,058	$ (442)	$ 1,005	$ 100,000	$ 101,005
Jun 30, 2014	$ 4,500	$ 4,040	$ (460)	$ 545	$ 100,000	$ 100,545
Dec 31, 2014	$ 4,500	$ 3,955	$ (545)	$ 0	$ 100,000	$ 100,000
Totals	$ 45,000	$ 40,900	$ (4,100)			

- Because the present value factors that we used were rounded to three decimal places, our calculations are not as precise as the amounts determined by use of computer software, a financial calculator, or factors with more decimal places. As a result, the amounts in year 2014 required a small adjustment.

Amortizing Bond Discount with the Effective Interest Rate Method

When a bond is sold at a discount, the amount of the bond discount must be amortized to interest expense over the life of the bond. Since the debit amount in the account Discount on Bonds Payable will be moved to the account Interest Expense, the amortization will cause each period's interest expense to be greater than the amount of interest paid during each of the years that the bond is outstanding.

NOTES

The preferred method for amortizing the bond discount is the *effective interest rate method* or the *effective interest method.* Under the effective interest rate method the amount of interest expense in a given accounting period will correlate with the amount of a bond's book value at the beginning of the accounting period. This means that as a bond's book value increases, the amount of interest expense will increase.

Before we demonstrate the effective interest rate method for a 5-year 9% $100,000 bond issued in a 10% market for $96,149, let's highlight a few points:

1. The bond discount of $3,851 must be amortized to Interest Expense over the life of the bond. The amortization will cause the bond's book value to increase from $96,149 on January 1, 2010 to $100,000 just prior to the bond maturing on December 31, 2014.
2. The corporation must make an interest payment of $4,500 ($100,000 x 9% x 6/12) on each June 30 and December 31 that the bonds are outstanding. The Cash account will be credited for $4,500 on each of these dates.
3. The effective interest rate is the *market interest rate* on the date that the bonds were issued. In our example the market interest rate on January 1, 2010 was 5% per semiannual period for 10 semiannual periods.
4. The effective interest rate is multiplied times the bond's book value at the start of the accounting period to arrive at each period's interest expense.

Check your Progress

3. State the use of time lines.
4. What is the effective interest rate?
5. What are callable bonds?

The following table illustrates the effective interest rate method of amortizing the $3,851 discount on bonds payable

Let's make a few points about the above table:

- Column B shows the *interest payments* required by the bond contract: The bond's stated rate of 9% per year divided by two semiannual periods = 4.5% per semiannual period multiplied times the face amount of the bond.
- Column C shows the *interest expense*. This calculation uses the market interest rate at the time the bonds were issued: The market rate of 10% per year divided by two semiannual periods = 5% semiannually.
- The interest expense in column C is the product of the 5% market

interest rate per semiannual period times the book value of the bond at the start of the semiannual period. Notice how the interest expense is increasing with the increase in the book value in column G. This correlation between the interest expense and the bond's book value makes the effective interest rate method the preferred method for amortizing the discount on bonds payable.

Because the present value factors that we used were rounded to three decimal positions, our calculations are not as precise as the amounts determined by use of computer software, a financial calculator, or factors that were carried out to more decimal places. As a result, our amortization amount in 2014 required a slight adjustment.

A	B	C	D	E	F	G
Date	Interest Payment Stated 4.5% x Face	Interest Expense Mkt 5% x Previous BV in G	Amortization of Bond Discount C minus B	Balance In the Account Bond Discount	Balance In the Account Bonds Payable	Book Value of the Bonds F minus E
	Credit Cash	Debit Interest Expense	Credit Bond Discount			
Jan 1, 2010				$ 3,851	$ 100,000	$ 96,149
Jun 30, 2010	$ 4,500	$ 4,807	$ 307	$ 3,544	$ 100,000	$ 96,456
Dec 31, 2010	$ 4,500	$ 4,822	$ 322	$ 3,222	$ 100,000	$ 96,778
Jun 30, 2011	$ 4,500	$ 4,839	$ 339	$ 2,883	$ 100,000	$ 97,117
Dec 31, 2011	$ 4,500	$ 4,856	$ 356	$ 2,527	$ 100,000	$ 97,473
Jun 30, 2012	$ 4,500	$ 4,874	$ 374	$ 2,153	$ 100,000	$ 97,847
Dec 31, 2012	$ 4,500	$ 4,892	$ 392	$ 1,761	$ 100,000	$ 98,239
Jun 30, 2013	$ 4,500	$ 4,912	$ 412	$ 1,349	$ 100,000	$ 98,651
Dec 31, 2013	$ 4,500	$ 4,933	$ 433	$ 916	$ 100,000	$ 99,084
Jun 30, 2014	$ 4,500	$ 4,954	$ 454	$ 462	$ 100,000	$ 99,538
Dec 31, 2014	$ 4,500	$ 4,962	$ 462	$ 0	$ 100,000	$ 100,000
Totals	$ 45,000	$ 48,851	$ 3,851			

NOTES

Market Interest Rates and Bond Prices

Once a bond is issued the issuing corporation must pay to the bondholders the bond's stated interest for the life of the bond. While the bond's stated interest rate will not change, the *market interest rate will be constantly changing* due to global events, perceptions about inflation, and many other factors which occur both inside and outside of the corporation.

The following terms are often used to mean *market* interest rate:

- *effective* interest rate
- *yield* to maturity
- *discount* rate
- *desired* rate

When Market Interest Rates *Increase*

Market interest rates are likely to increase when bond investors believe that inflation will occur. As a result, bond investors will demand to earn higher interest rates. The investors fear that when their bond investment matures, they will be repaid with dollars of significantly less purchasing power.

Let's examine the effects of higher market interest rates on an existing bond by first assuming that a corporation issued a 9% $100,000 bond when the market interest rate was also 9%. Since the bond's stated interest rate of 9% was the same as the market interest rate of 9%, the bond should have sold for $100,000.

Next, let's assume that after the bond had been sold to investors, the market interest rate increased to 10%. The issuing corporation is required to pay only $4,500 of interest every six months as promised in its bond agreement ($100,000 x 9% x 6/12) and the bondholder is required to accept $4,500 every six months. However, the market will demand that new bonds of $100,000 pay $5,000 every six months (market interest rate of 10% x $100,000 x 6/12 of a year). The existing bond's semiannual interest of $4,500 is $500 less than the interest required from a new bond. Obviously the existing bond paying 9% interest in a market that requires 10% will see its value decline.

An existing bond's *market value will decrease* when the *market interest*

rates increase. The reason is that an existing bond's fixed interest payments are smaller than the interest payments now demanded by the market.

When Market Interest Rates *Decrease*

Market interest rates are likely to decrease when there is a slowdown in economic activity. In other words, the loss of purchasing power due to inflation is reduced and therefore the risk of owning a bond is reduced.

Let's examine the effect of a decrease in the market interest rates. First, let's assume that a corporation issued a 9% $100,000 bond when the market interest rate was also 9% and therefore the bond sold for its face value of $100,000.

Next, let's assume that after the bond had been sold to investors, the market interest rate decreased to 8%. The corporation must continue to pay $4,500 of interest every six months as promised in its bond agreement ($100,000 x 9% x 6/12) and the bondholder will receive $4,500 every six months. Since the market is now demanding only $4,000 every six months (market interest rate of 8% x $100,000 x 6/12 of a year) and the existing bond is paying $4,500, the existing bond will become more valuable. In other words, the additional $500 every six months for the life of the 9% bond will mean the bond will have a market value that is greater than $100,000.

An existing bond's *market value will* increase when the *market interest rates decrease*. An existing bond becomes more valuable because its fixed interest payments are larger than the interest payments currently demanded by the market.

Relationship Between Market Interest Rates and a Bond's Market Value

As we had seen, the market value of an existing bond will move in the opposite direction of the change in market interest rates.

When market interest rates increase, the market value of an existing bond decreases.

When market interest rates decrease, the market value of an existing bond increases.

The relationship between market interest rates and the market value of

NOTES

a bond is referred to as an inverse relationship. Perhaps you have heard or read financial news that stated "Bond prices and bond yields move in opposite directions" or "Bond prices rallied, lowering their yield..." or "The rise in interest rates caused the price of bonds to fall."

If you were the treasurer of a large corporation and could predict interest rates, you would...

- *Issue bonds prior to market interest rates increasing* in order to lock-in smaller interest payments.

If you were an investor and could predict interest rates, you would...

- *Purchase bonds prior to market interest rates dropping*. You would do this in order to receive the relatively high current interest amounts for the life of the bonds. (However, be aware that bonds are often callable by the issuer.)
- *Sell bonds that you own before market interest rates rise*. You would do this because you don't want to be locked-in to your bond's current interest amounts when higher rates and amounts will be available soon.

7.8 ADDITIONAL BOND TERMINOLOGY

Bonds are a form of long-term debt and might be referred to as a debt security.

Bonds allow corporations to use *financial leverage* or to *trade on equity*. The reason is that a corporation issuing bonds can control larger amounts of assets without increasing its common stock.

Bonds that mature on a single maturity date are known as *term bonds*. Bonds that mature over a series of dates are *serial bonds*.

Bonds that have specific assets pledged as collateral are *secured bonds*. An example of a secured bond would be a *mortgage bond* that has a lien on real estate.

Bonds that do not have specific collateral and instead rely on the corporation's general financial position are referred to as *unsecured bonds* or *debentures*.

Convertible bonds allow the bondholder to exchange the bond for a speci-

fied number of shares of common stock. Most bonds are *not* convertible bonds.

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Some bonds require the issuing corporation to deposit money into an account that is restricted for the payment of the bonds' maturity amount. The restricted account is Bond Sinking Fund and it is reported in the long-term investment section of the balance sheet.

Callable bonds are bonds that give the issuing corporation the right to repurchase its bonds by paying the bondholders the bonds' face amount plus an additional amount known as the *call premium*. The call premium might be one year of additional interest. A bond's *call price* and other conditions can be found in a bond's contract known as the *indenture*.

Many years ago corporate bonds could be unregistered. Such bonds were known as *bearer bonds* and the bonds had coupons attached that the bearer would "clip" and deposit at the bearer's bank. Today, corporations do not issue bearer bonds. Instead, they issue *registered bonds*.

There are various fees that a corporation must pay when issuing bonds. These fees include payments to attorneys, accounting firms, and securities consultants. These costs are referred to as *issue costs*. Issue costs are likely to be recorded in the account Bond Issue Costs. This account appears on the balance sheet under the heading of Other Assets or Deferred Charges. Over the life of the bonds the balance in the long term asset account Bond Issue Costs will be amortized to expense.

When bond interest rates are discussed, the term *basis point* is often used. A basis point is 1/100th of one percentage point. For example, if a market interest rate increases from 6.25% to 6.50%, the rate is said to have increased by 25 basis points.

7.9 ANSWERS TO CHECK YOUR PROGRESS

1. The rate of return that an investor would earn if he bought the bond at its current market price and held it until maturity.
2. The rate of return that an investor would earn if he bought a callable bond at its current market price and held it until the call date given that the bond was call on the call date.

NOTES

3. It is helpful to prepare a timeline to visualize the cash payments that a corporation promises to pay its bondholders.
4. The Compound Interest are calculated on Monthly Basis.
5. Callable bonds are bonds that give the issuing corporations the right to repurchase its bonds.

7.10 REVIEW QUESTIONS

1. What is yield to maturity? How it is calculated?
2. What is meant by duration of bond? Explain its significance.
3. "Bond prices vary inversely with changes in market interest rates". Explain with examples.

7.11 REFERENCES

1. INVESTMENT ANALYLSIS AND PORTFOLIO MANAGEMENT – Prasanna Chandra – Tata Mc Graw Hill.+
2. PORTFOLIO MANAGEMENT – Baruna S..K. and V. Raghunathan, J.R. Varma, Tata Mcgrawhill.
3. PORTFOLIO MANAGEMENT – S. Kevin
4. SECURITY ANALYUSIS AND PORTFOLIO MANAGEMENT - S. Kevin
5. SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT – M. Renganatham and R. Madhumathi
6. WWW.INVESTOPEDIA.COM

MODERN PORTFOLIO THEORY

NOTES

UNIT STRUCTURE

8.1 INTRODUCTION
8.2 THE CAPITAL ASSET PRICING MODEL
8.3 PORTFOLIO MANAGEMENT SCAFFOLD
8.4 PORTFOLIO EXECUTION
8.5 PORTFOLIO EVALUATION
8.6 PORTFOLIO REVISION
8.7 SUMMARY
8.9 ANSWERS TO CHECK YOUR PROGRESS
8.10 REVIEW QUESTIONS
8.11 REFERENCES

UNIT OBJECTIVES

1. To make preface appraisal of the risk tolerance
2. To select the appropriate asset allocation mix based on time horizon and risk tolerance
3. To explain the theories of portfolio strategy
4. To understand the nature of trading game
5. To identify the different measures of portfolio performance

8.1 INTRODUCTION

The fundamental concept behind MPT is that the assets in an investment portfolio should not be selected individually, each on their own merits. Rather, it is important to consider how each asset changes in price relative to how every other asset in the portfolio changes in price.

Investing is a tradeoff between risk and expected return. In general, assets with higher expected returns are riskier. For a given amount of risk MPT describes how to select a portfolio with the highest possible expected return. Or, for a given expected return, MPT explains how to select a portfolio with the lowest possible risk (the targeted expected return cannot be more than the highest-returning available security, of course, unless negative holdings of assets are possible.)

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MPT is therefore a form of diversification. Under certain assumptions and for specific quantitative definitions of risk and return, MPT explains how to find the best possible diversification strategy.

8.1.1 HISTORY

Harry Markowitz introduced MPT in a 1952 article[5] and a 1959 book.[6] Markowitz classifies it simply as "Portfolio Theory," because "There's nothing modern about it." See also this[survey of the history.

8.1.2 MODERN PORTFOLIO THEORY (MPT)

MPT is a theory of investment which attempts to maximize portfolio expected return for a given amount of portfolio risk, or equivalently minimize risk for a given level of expected return, by carefully choosing the proportions of various assets. Although MPT is widely used in practice in the financial industry and several of its creators won a Nobel memorial prize for the theory, in recent years the basic assumptions of MPT have been widely challenged by fields such as behavioral economics.

Check your Progress
1. What is Modern Portfolio Theory?

MPT is a mathematical formulation of the concept of diversification in investing, with the aim of selecting a collection of investment assets that has collectively lower risk than any individual asset. That this is possible can be seen intuitively because different types of assets often change in value in opposite ways. For example, as prices in the stock market tend to move independently from prices in the bond market, a collection of both types of assets can therefore have lower overall risk than either individually. But diversification lowers risk even if assets' returns are not negatively correlated—indeed, even if they are positively correlated.

More technically, MPT models an asset's return as a normally distributed function (or more generally as an elliptically distributed random variable), defines risk as the standard deviation of return, and models a portfolio as a weighted combination of assets so that the return of a portfolio is the weighted combination of the assets' returns. By combining different assets whose returns are not perfectly positively correlated, MPT seeks to reduce the total variance of the portfolio return. MPT also assumes that investors are rational and markets are efficient.

MPT was developed in the 1950s through the early 1970s and was considered an important advance in the mathematical modeling of finance. Since then, many theoretical and practical criticisms have been leveled against it. These include the fact that financial returns do not follow a Gaussian distribu-

tion or indeed any symmetric distribution, and that correlations between asset classes are not fixed but can vary depending on external events (especially in crises). Further, there is growing evidence that investors are not rational and markets are not efficient.[2][3]

Mathematical model

In some sense the mathematical derivation below *is* MPT, although the basic concepts behind the model have also been very influential.[4]

This section develops the "classic" MPT model. There have been many extensions since.

Risk and expected return

MPT assumes that investors are risk averse, meaning that given two portfolios that offer the same expected return, investors will prefer the less risky one. Thus, an investor will take on increased risk only if compensated by higher expected returns. Conversely, an investor who wants higher expected returns must accept more risk. The exact trade-off will be the same for all investors, but different investors will evaluate the trade-off differently based on individual risk aversion characteristics. The implication is that a rational investor will not invest in a portfolio if a second portfolio exists with a more favorable risk-expected return profile – i.e., if for that level of risk an alternative portfolio exists which has better expected returns.

Note that the theory uses standard deviation of return as a proxy for risk, which is valid if asset returns are jointly normally distributed or otherwise elliptically distributed. There are problems with this, however; see criticism.

Under the model:

- Portfolio return is the proportion-weighted combination of the constituent assets' returns.
- Portfolio volatility is a function of the correlations $\tilde{n}_{ij}$ of the component assets, for all asset pairs (i, j).

In general:

Expected return

$$\mathrm{E}(R_p) = \sum_i w_i \mathrm{E}(R_i)$$

where R_p is the return on the portfolio, R_i is the return on asset i and w_i is the weighting of component asset i (that is, the share of asset i in the portfolio).

Portfolio return variance

$$\sigma_p^2 = \sum_i w_i^2\sigma_i^2 + \sum_i \sum_{j\neq i} w_i w_j \sigma_i \sigma_j \rho_{ij}$$

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When ρ_{ij} is the correlation coefficient between the returns on assets i and j Alternatively the expression can be written as:

$$\sigma_p^2 = \sum_i \sum_j w_i w_j \sigma_i \sigma_j \rho_{ij}$$

where $\rho_{ij} = 1$ for $i=j$.

- Portfolio return volatility (standard deviation):

$$\sigma_p = \sqrt{\sigma_p^2}$$

For a two asset portfolio:

- Portfolio return

$$\mathrm{E}(R_p) = w_A \mathrm{E}(R_A) + w_B \mathrm{E}(R_B) = w_A \mathrm{E}(R_A) + (1 - w_A)\mathrm{E}(R_B).$$

- Portfolio variance: $\sigma_p^2 = w_A^2\sigma_A^2 + w_B^2\sigma_B^2 + 2w_A w_B \sigma_A \sigma_B \rho_{AB}$

For a three asset portfolio:

- Portfolio return: $w_A \mathrm{E}(R_A) + w_B \mathrm{E}(R_B) + w_C \mathrm{E}(R_C)$
- Portfolio variance $\sigma_p^2 = w_A^2\sigma_A^2 + w_B^2\sigma_B^2 + w_C^2\sigma_C^2 + 2w_A w_B \sigma_A \sigma_B \rho_{AB} + 2w_A w_C \sigma_A \sigma_C \rho_{AC} + 2w_B w_C$

Diversification

An investor can reduce portfolio risk simply by holding combinations of instruments which are not perfectly positively correlated (correlation coefficient $-1 \leq \rho_{ij} < 1$)). In other words, investors can reduce their exposure to individual asset risk by holding a diversified portfolio of assets. Diversification may allow for the same portfolio expected return with reduced risk.

If all the asset pairs have correlations of 0—they are perfectly uncorrelated—the portfolio's return variance is the sum over all assets of the square of the fraction held in the asset times the asset's return variance (and the portfolio standard deviation is the square root of this sum).

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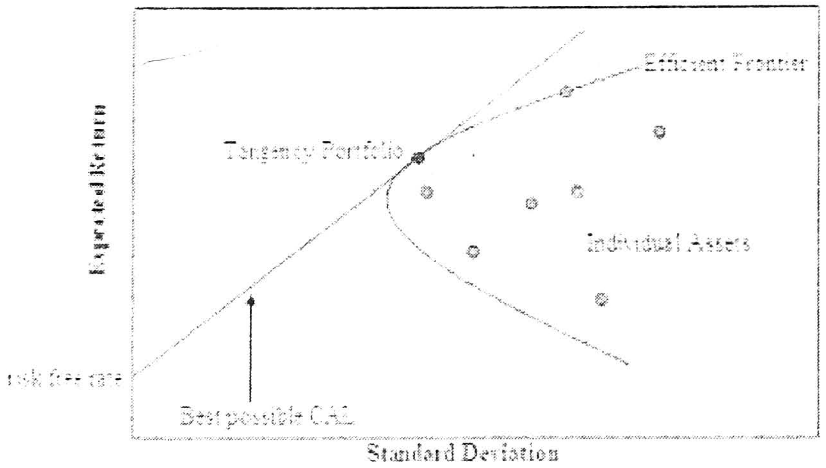
The efficient frontier with no risk-free asset



Efficient Frontier.

Efficient frontier

The efficient frontier describes the relationship between the return that can be expected from a portfolio and the riskiness (volatility) of the portfolio. It can be drawn as a curve on a graph of risk against expected return of a portfolio. The efficient frontier gives the best return that can be expected for a given level of risk or the lowest level of risk needed to achieve a given expected rate of return.

The efficient frontier is a key concept of modern portfolio theory. Things get rather more interesting in post-modern portfolio theory which has an infinite number of efficient frontiers: the frontier for each investor depends on their risk appetite and preferences.

The efficient frontier is usually used to describe the curve that is drawn in the absence of a risk free asset. With a risk free asset available it becomes a straight line: the securities market line.

The market portfolio lies in the efficient frontier, at the point at which it touches the securities market line.

The efficient frontier is extremely important to the theory of portfolio construction and valuation.

The concept of an efficient frontier can be used to illustrate the benefits of diversification. An undiversified portfolio can be moved closer to the efficient frontier by diversifying it. Diversification can, therefore, increase returns without increasing risk, or reduce risk without reducing expected returns.

As shown in this graph, every possible combination of the risky assets, without including any holdings of the risk-free asset, can be plotted in risk-expected return space, and the collection of all such possible portfolios defines

a region in this space. The left boundary of this region is a hyperbola,[7] and the upper edge of this region is the *efficient frontier* in the absence of a risk-free asset (sometimes called "the Markowitz bullet"). Combinations along this upper edge represent portfolios (including no holdings of the risk-free asset) for which there is lowest risk for a given level of expected return. Equivalently, a portfolio lying on the efficient frontier represents the combination offering the best possible expected return for given risk level.

The two mutual fund theorem

One key result of the above analysis is the two mutual fund theorem.[7] This theorem states that any portfolio on the efficient frontier can be generated by holding a combination of any two given portfolios on the frontier; the latter two given portfolios are the "mutual funds" in the theorem's name. So in the absence of a risk-free asset, an investor can achieve any desired efficient portfolio even if all that is accessible is a pair of efficient mutual funds.

If the location of the desired portfolio on the frontier is between the locations of the two mutual funds, both mutual funds will be held in positive quantities. If the desired portfolio is outside the range spanned by the two mutual funds, then one of the mutual funds must be sold short (held in negative quantity) while the size of the investment in the other mutual fund must be greater than the amount available for investment (the excess being funded by the borrowing from the other fund).

The risk-free asset and the capital allocation line

The risk-free asset is the (hypothetical) asset which pays a risk-free rate. In practice, short-term government securities (such as US treasury bills) are used as a risk-free asset, because they pay a fixed rate of interest and have exceptionally low default risk. The risk-free asset has zero variance in returns (hence is risk-free); it is also uncorrelated with any other asset (by definition, since its variance is zero). As a result, when it is combined with any other asset, or portfolio of assets, the change in return is linearly related to the change in risk as the proportions in the combination vary.

When a risk-free asset is introduced, the half-line shown in the figure is the new efficient frontier. It is tangent to the hyperbola at the pure risky portfolio with the highest Sharpe ratio. Its horizontal intercept represents a portfolio with 100% of holdings in the risk-free asset; the tangency with the hyperbola represents a portfolio with no risk-free holdings and 100% of assets held in the portfolio occurring at the tangency point; points between those points

are portfolios containing positive amounts of both the risky tangency portfolio and the risk-free asset; and points on the half-line beyond the tangency point are leveraged portfolios involving negative holdings of the risk-free asset (the latter has been sold short—in other words, the investor has borrowed at the risk-free rate) and an amount invested in the tangency portfolio equal to more than 100% of the investor's initial capital. This efficient half-line is called the capital allocation line (CAL), and its formula can be shown to be

$$E(R_C) = R_F + \sigma_C \frac{E(R_P) - R_F}{\sigma_P}.$$

In this formula P is the sub-portfolio of risky assets at the tangency with the Markowitz bullet, F is the risk-free asset, and C is a combination of portfolios P and F.

By the diagram, the introduction of the risk-free asset as a possible component of the portfolio has improved the range of risk-expected return combinations available, because everywhere except at the tangency portfolio the half-line gives a higher expected return than the hyperbola does at every possible risk level. The fact that all points on the linear efficient lócus can be achieved by a combination of holdings of the risk-free asset and the tangency portfolio is known as the one mutual fund theorem,[7] where the mutual fund referred to is the tangency portfolio.

Asset pricing using MPT

The above analysis describes optimal behavior of an individual investor. Asset pricing theory builds on this analysis in the following way. Since everyone holds the risky assets in identical proportions to each other—namely in the proportions given by the tangency portfolio—in market equilibrium the risky assets' prices, and therefore their expected returns, will adjust so that the ratios in the tangency portfolio are the same as the ratios in which the risky assets are supplied to the market. Thus relative supplies will equal relative demands. MPT derives the required expected return for a correctly priced asset in this context.

Systematic risk and specific risk

Specific risk is the risk associated with individual assets - within a portfolio these risks can be reduced through diversification (specific risks "cancel out"). Specific risk is also called diversifiable, unique, unsystematic, or idiosyncratic risk. Systematic risk (a.k.a. portfolio risk or market risk) refers to the risk common to all securities - except for selling short as noted below.

NOTES

Check your Progress

2. What is CAPM?

systematic risk cannot be diversified away (within one market). Within the market portfolio, asset specific risk will be diversified away to the extent possible. Systematic risk is therefore equated with the risk (standard deviation) of the market portfolio.

Since a security will be purchased only if it improves the risk-expected return characteristics of the market portfolio, the relevant measure of the risk of a security is the risk it adds to the market portfolio, and not its risk in isolation. In this context, the volatility of the asset, and its correlation with the market portfolio, are historically observed and are therefore given. (There are several approaches to asset pricing that attempt to price assets by modelling the stochastic properties of the moments of assets' returns - these are broadly referred to as conditional asset pricing models.)

Systematic risks within one market can be managed through a strategy of using both long and short positions within one portfolio, creating a "market neutral" portfolio.

8.1.3 CAPITAL ASSET PRICING MODEL

William Sharpe (1964) published the capital asset pricing model (CAPM). Parallel work was also performed by Treynor (1961) and Lintner (1965). CAPM extended Harry Markowitz's portfolio theory to introduce the notions of systematic and specific risk. For his work on CAPM, Sharpe shared the 1990 Nobel Prize in Economics with Harry Markowitz and Merton Miller.

CAPM considers a simplified world where:

There are no taxes or transaction costs.

All investors have identical investment horizons.

All investors have identical opinions about expected returns, volatilities and correlations of available investments.

In such a simple world, Tobin's (1958) super-efficient portfolio must be the market portfolio. All investors will hold the market portfolio, leveraging or de-leveraging it with positions in the risk-free asset in order to achieve a desired level of risk.

CAPM decomposes a portfolio's risk into systematic and specific risk. Systematic risk is the risk of holding the market portfolio. As the market moves, each individual asset is more or less affected. To the extent that any asset participates in such general market moves, that asset entails systematic risk. Specific risk is the risk which is unique to an individual asset. It represents the component of an asset's return which is uncorrelated with general market moves.

NOTES

According to CAPM, the marketplace compensates investors for taking systematic risk but not for taking specific risk. This is because specific risk can be diversified away. When an investor holds the market portfolio, each individual asset in that portfolio entails specific risk, but through diversification, the investor's net exposure is just the systematic risk of the market portfolio.

Systematic risk can be measured using beta. According to CAPM, the expected return of a stock equals the risk-free rate plus the portfolio's beta multiplied by the expected excess return of the market portfolio. Specifically, let and be random variables for the simple returns of the stock and the market over some specified period. Let be the known risk-free rate, also expressed as a simple return, and let be the stock's beta. Then

$$E(Z_s) = z_f + \beta[E(Z_m) - z_f] \qquad [1]$$

where E denotes an expectation.

Stated another way, the stock's excess expected return over the risk-free rate equals its beta times the market's expected excess return over the risk free rate.

For example, suppose a stock has a beta of 0.8. The market has an expected annual return of 0.12 (that is 12%) and the risk-free rate is .02 (2%). Then the stock has an expected one-year return of

$$E(Z_s) = .02 + .8[.12 - .02] = 0.10 \qquad [2]$$

Because [1] is linear, it generalizes to portfolios. Let Z_p be a portfolio's simple return, and let β now denote the portfolio's beta. We obtain

$$E(Z_p) = z_f + \beta[E(Z_m) - z_f] \qquad [3]$$

Formula [1] is the essential conclusion of CAPM. It states that a stock's (or portfolio's) excess expected return depends on its beta and not its volatility. Stated another way, excess return depends upon systematic risk and not on total risk.

We call CAPM a "capital asset pricing model" because, given a beta and an expected return for an asset, investors will bid its current price up or down, adjusting that expected return so that it satisfies formula [1]. Accordingly, the CAPM predicts the equilibrium price of an asset. This works because the model *assumes* that all investors agree on the beta and expected return of any asset. In practice, this assumption is unreasonable, so the CAPM is largely of theoretical value. It is the most famous example of an equilibrium pricing model.

Security characteristic line

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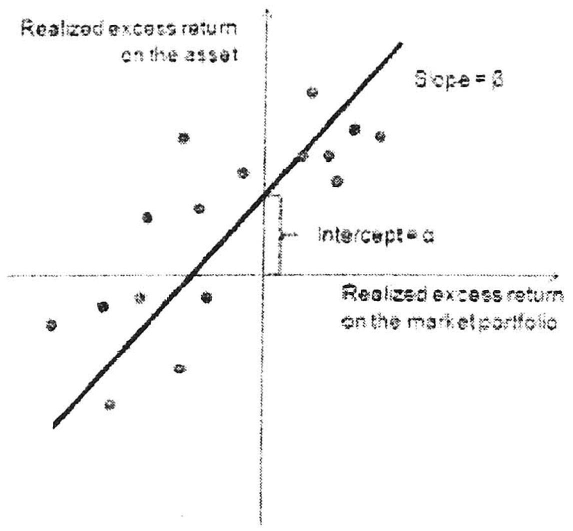


Security characteristic line

Positive ab normal return (α) Above average returns that cannot be explained as compensation for added risk.

Negative abnormal returns (α) : Below-average returns that cannot be explained by below - market risk.

Security characteristic line (SCL) : is a regression line[1], plotting performance of a particular security or port folio against that of the market portfolio at every point in time. The SCL is plotted on a graph where Y-axis is the excess return on a security over the risk-line return and the X-axis is the excess return of the market in general. The slope of the SCL is the excess return os the market in general. The slope of the SCL is the security beta, and the intercept is its alpha(2).

Formula

$$SCL : R_{i,t} - R_f = \alpha_i + \beta_i (R_{M,t} - R_f) + \epsilon_{i,t}$$

Where

α is called assest's alpha (abnormal return)

$\beta (R_{Mt} - R_f)$ is a non diversifiale or systematic risk

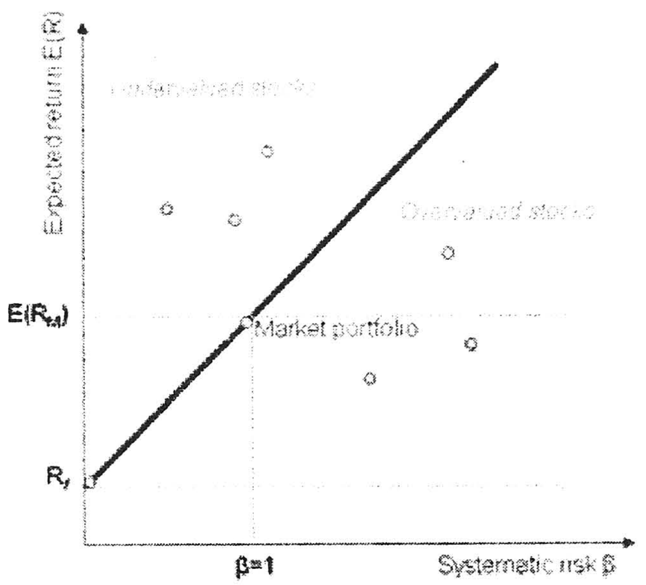
$e_{i,t}$ is a diversifiable or idiosyncratic risk[3]

8.1.4 SECURITY MARKET LINE

A line that graphs the systematic, or market, risk versus return of the

whole market at a certain time and shows all risky marketable securities. The SML essentially graphs the results from the capital asset pricing model (CAPM) formula. The x-axis represents the risk (beta), and the y-axis represents the expected return. The market risk premium is determined from the slope of the SML.

The security market line is a useful tool in determining whether an asset being considered for a portfolio offers a reasonable expected return for risk. Individual securities are plotted on the SML graph. If the security's risk versus expected return is plotted above the SML, it is undervalued because the investor can expect a greater return for the inherent risk. A security plotted below the SML is overvalued because the investor would be accepting less return for the amount of risk assumed.



Security market line (SML) is the graphical representation of the Capital asset pricing model. It displays the expected rate of return of an individual security as a function of systematic, non-diversifiable risk (its beta).[1]

Formula

The Y-intercept (beta= -.2) of the SML is equal to the risk-free interest rate. The slope of the SML is equal to the market risk premium and reflects the risk return trade off at a given time:

$$\mathrm{SML}: E(R_i) = R_f + \beta_i[E(R_M) - R_f]$$

When used in portfolio management, the SML represents the investment's opportunity cost (investing in a combination of the market portfolio and the risk-free asset). All the correctly priced securities are plotted on the SML. The

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Check your Progress

3. What is SML?

NOTES

assets above the line are undervalued because for a given amount of risk (beta), they yield a higher return. The assets below the line are overvalued because for a given amount of risk, they yield a lower return.[2]

There is a question what the SML is when beta is negative. A rational investor should reject all the assets yielding sub-risk-free returns, so beta-negative returns have to be higher than the risk-free rate. Therefore, the SML should be V-shaped.

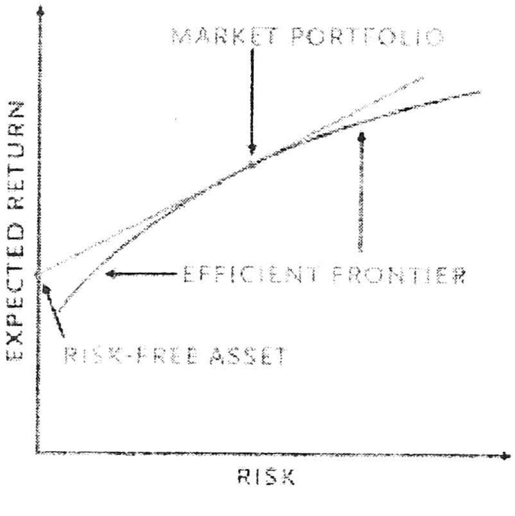
8.1.5 CAPITAL MARKET LINE

A line used in the capital asset pricing model to illustrate the rates of return for efficient portfolios depending on the risk-free rate of return and the level of risk (standard deviation) for a particular portfolio. The CML is derived by drawing a tangent line from the intercept point on the efficient frontier to the point where the expected return equals the risk-free rate of return.

The CML is considered to be superior to the efficient frontier since it takes into account the inclusion of a risk-free asset in the portfolio. The capital asset pricing model (CAPM) demonstrates that the market portfolio is essentially the efficient frontier. This is achieved visually through the security market line (SML).

Check your Progress

4. What is CML?
5. What is an Efficient Frontier?



8.1.6 EFFICIENT MARKET THEORY

An investment theory that states it is impossible to "beat the market" because stock market efficiency causes existing share prices to always incorporate and reflect all relevant information. According to the EMH, stocks always trade at their fair value on stock exchanges, making it impossible for

investors to either purchase undervalued stocks or sell stocks for inflated prices. As such, it should be impossible to outperform the overall market through expert stock selection or market timing, and that the only way an investor can possibly obtain higher returns is by purchasing riskier investments.

The efficient market hypothesis—like the random walk hypothesis it grew out of—is not so much a hypothesis as it is a model for how markets perform. As a model, it applies to some markets more than others. A market is said to be efficient if prices in that market reflect all available information.

Suppose you hear that a firm has just announced quarterly earnings that exceed analysts' predictions. You rush to buy the stock but find its price has already risen two dollars from the previous day's close. Are you too late? Might the price continue to rise on the positive news, or has the market overreacted? Perhaps you should sell short instead of buying? The efficient market hypothesis says these questions are mute—that whatever information you consider in making a decision has already been incorporated into prices and is useless for predicting future prices of the stock. Market efficiency renders speculative trading pointless. We will elaborate on this shortly, but let's first consider some background.

The random walk hypothesis of the early 1960s was an empirical result. Based on time-series analyses of past prices, researchers concluded that the prices behaved like geometric random walks. This threw cold water on the practice of technical analysis, suggesting the predictive price patterns technicians divined from price charts were only figments of their imagination. However, the absence of predictive price patterns does not mean that prices cannot be predicted using other information. It ruled out technical analysis but not fundamental analysis.

Some of the literature supporting the random walk hypothesis—especially Alfred Cowles' work—did seem to discredit fundamental analysis as well. Rather than study time series of prices, Cowles studied the performance of investment managers and investment newsletters. Presumably, these employed a variety of analytic techniques to make stock picks. Their collective poor performance cast doubt, not only on technical analysis, but on all means of speculative trading. In the late 1960s and early 1970s, Eugene Fama's efficient market hypothesis extended the random walk hypothesis to throw cold water on all forms of analysis employed by speculative traders.

Fama had helped pay his way through college by working for professor

Harry Ernst, who published a newsletter recommending stock picks based on technical analysis. He gave Fama the job of studying past prices to identify profitable trading systems. Identifying systems that performed well on the historical data was easy, but they routinely failed when implemented. Fama was learning for himself what is widely know to professional investors—that data mining can produce all sorts of trading systems that work beautifully on the data from which they are derived but are worthless otherwise.

Fama took these experiences with him to the University of Chicago, where he earned a PhD in finance. His thesis was published in the *Journal of Business* in 1965 as the "Behavior of stock market prices." This elaborated on the random walk hypothesis, fleshing out other researchers' justification for why prices should follow a random walk. It reported on Fama's own empirical studies of past price data. Advances in computers had made it possible for him to perform more elaborate studies than earlier researchers. Fama also looked at flaws in the random walk hypothesis, focusing especially on the issue of market leptokurtosis. His overall conclusions were dismal for market technicians. The random walk hypothesis was an excellent model for the markets, and whatever flaws it might have weren't anything that would present market technicians with trading opportunities.

Although Fama's paper was about the random walk hypothesis, it is notable for introducing the term "efficient market" and anticipating the efficient market hypothesis: [1]

... a situation where successive price changes are independent is *consistent with* the existence of an "efficient" market for securities, that is, a market where, given the available information, actual prices at every point in time represent very good estimates of intrinsic values ...

In an abbreviated version of his paper, which Fama (1965) wrote for the practitioner-oriented *Financial Analysts Journal*, he elaborated: [2]

An "efficient" market is defined as a market where there are large numbers of rational, profit-maximizers actively competing, with each trying to predict future market values of individual securities, and where important current information is almost freely available to all participants ... *on the average*, competition will cause the full effects of new information on intrinsic values to be reflected "instantaneously" in actual prices.

But he still held out hope for fundamental analysts

... the existence of many sophisticated analysts helps make the market

more efficient which in turn implies a market which conforms more closely to the random walk model. Although the returns to these sophisticated analysts may be quite high, they establish a market in which fundamental analysis is a fairly useless procedure both for the average analyst and the average investor.

This was just so much theory, unsupported by empirical facts. Fama's empirical work had exclusively looked at time series of prices, and a study of fundamental analysis would likely need to look at investment managers' performance or study security price movements following announcements, such as stock splits or earnings announcements. In 1965, the scant research along such lines—Cowles (1933), Friend et al (1962) and Horowitz (1963) studied investment managers' performance—had found no evidence of sophisticated analysts earning "quite high" returns.

Between 1965 and 1970, many empirical studies were performed on stock price behavior or investment managers' performance. These culminated in 1970 with Fama's second landmark paper, which appeared in the *Journal of Finance* and was titled "Efficient capital markets: A review of theory and empirical work." In it, Fama elaborated on his theory of efficient markets and reviewed the developing literature. Based on the terminology of his colleague Harry Roberts, he reported on empirical tests for three different levels of market efficiency:

A market has weak efficiency if prices fully reflect any information contained in past price data. Weak efficiency rejects technical analysis. It is essentially the random walk hypothesis but without as full a characterization of the stochastic process that describes price behavior.

A market has semi-strong efficiency if prices fully reflect all readily-available public information—past prices, economic news, earnings reports, etc. Tests of semi-strong efficiency are those that study stock price movements following announcements, such as stock splits or earnings announcements.

A market has strong efficiency if prices fully reflect all public and privileged information. Privileged information includes knowledge available to a market maker, insider information available to corporate managers, or information that investment managers spend time and money to compile for their own use.

Fama's 1965 paper had explored the random walk hypothesis, and there was nothing unexpected to report in 1970. Empirical studies of the random walk hypothesis strongly supported weak market efficiency.

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8.1.7 RANDOM WALK THEORY

Random walk theory gained popularity in 1973 when Burton Malkiel wrote "A Random Walk Down Wall Street", a book that is now regarded as an investment classic. Random walk is a stock market theory that states that the past movement or direction of the price of a stock or overall market cannot be used to predict its future movement. Originally examined by Maurice Kendall in 1953, the theory states that stock price fluctuations are independent of each other and have the same probability distribution, but that over a period of time, prices maintain an upward trend.

In short, random walk says that stocks take a random and unpredictable path. The chance of a stock's future price going up is the same as it going down. A follower of random walk believes it is impossible to outperform the market without assuming additional risk. In his book, Malkiel preaches that both technical analysis and fundamental analysis are largely a waste of time and are still unproven in outperforming the markets.

Malkiel constantly states that a long-term buy-and-hold strategy is the best and that individuals should not attempt to time the markets. Attempts based on technical, fundamental, or any other analysis are futile. He backs this up with statistics showing that most mutual funds fail to beat benchmark averages like the S&P 500.

It's hard to say how much truth there is to this theory; there is evidence that supports both sides of the debate.

Market portfolio

The market portfolio is a portfolio containing every available asset in proportion to the value of it that exists (i.e. its market cap).

The market portfolio exists at the point at which the securities markets line touches the efficient frontier.

The market portfolio is an important concept from the point of view of modern portfolio theory, but it is important to note that it is not practical to actual construct a market portfolio in this sense as it would have to include every single available asset, not just listed securities, but all alternative investments as well.

That said, it is difficult to believe that the market portfolio would lie on the efficient frontier if it was also not true that the portfolio of all investments in a smaller universe of investments did not also lie on the efficient frontier of that smaller universe.

This is the justification for promoting index tracking as an investment strategy: if the above is correct, then the optimum combination of risk and reward (e.g. the highest return for a given level of risk) will always be produced by the market portfolio plus risk free assets, and an index tracker is the best available proxy for the market portfolio.

It also implies that the combination of risk and return can be improved (higher return for the same risk) by expanding the universe of investments. This is the key justification for investing globally, and for investing in alternative assets.

The concept of a market portfolio still have some importance without modern portfolio theory, but it would not be as central, nor would it imply the same advantages for tracker funds.

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Fisher's Separation Theorem

A theory stating that:

1. A firm's choice of investments are separate from its owner's attitudes towards the investments.
2. It is possible to separate a firm's investment decisions from the firm's financial decisions.

This theory says a firm's value is not affected by how its investments are financed or how the distributions (dividends) are made to the owners.

8.1.8 ARBITRAGE PRICING THEORY

APT holds that the expected return of a financial asset can be modeled as a linear function of various macro-economic factors or theoretical market indices, where sensitivity to changes in each factor is represented by a factor-specific beta coefficient. The model-derived rate of return will then be used to price the asset correctly - the asset price should equal the expected end of period price discounted at the rate implied by the model. If the price diverges, arbitrage should bring it back into line.

Check your Progress

6. What is Arbitrage Pricing Theory?

The theory was initiated by the economist Stephen Ross in 1976.

The arbitrage pricing theory is an alternative paradigm used to calculate equilibrium expected returns on financial assets. As its name suggests, it rests on the notion that well-functioning financial markets should be arbitrage-free. This, using a factor model of asset returns, implies restrictions on the relationships between asset returns and generates an equilibrium pricing relationship.

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METHODOLOGY

The arbitrage pricing theory (APT) developed in this chapter gives an alternative to the CAPM as a method to compute the expected returns on stocks. The basis for the APT is a factor model of stock returns, and we will define and discuss these models first. From there we will demonstrate how to derive expected returns using the idea that the returns on stocks, which are exposed to a common set of factors, must be mutually consistent, given each stock's sensitivity to each factor.

To give structure to what we mean by 'mutually consistent', we need to define the notion of an arbitrage. An arbitrage strategy can be one of two types.

- It could involve investment in a set of assets (both buying and selling) that yields an immediate, positive cash inflow (i.e. the receipts from our sales exceed the cost of our purchases) and, further, is guaranteed not to make a loss tomorrow. Faced by an investment strategy with this payoff structure, any investor who prefers more to less wealth would try to invest on an infinite scale.
- It could be an investment strategy that is costless today but guarantees positive future returns. This is akin to receiving something for nothing, and again, sensible investors would capitalise on the possibility by investing as much as possible.

The idea that underpins the APT is that investment situations, such as those described above, should not be permitted in well-functioning financial markets. Then, if financial markets do not permit the existence of arbitrage strategies, this places restrictions on the relationships between the expected returns on assets given the factor structure underlying returns. We will explain further in later sections of this chapter.

SINGLE-FACTOR MODELS

Before using the notion of absence of arbitrage to provide pricing relations,we need a basis for the generation of stock returns. Within the context of the APT, this basis is given by the assumption that the population of

stock returns is generated by a factor model. The simplest factor model, given below, is a one-factor model:

$$ri = ái + âi\ F + åi\ E(åi) = 0. \qquad \text{(Eq 1)}$$

In equation .1, the returns on stock *i* are related to two main components:

1. The first of these is a component that involves the factor *F*. This factor is posited to affect all stock returns, although with differing sensitivities. The sensitivity of stock *i*'s return to *F* is *âi*. Stocks that have small values for this parameter will react only slightly as *F* changes, whereas when *âi* is large, variations in *F* cause very large movements in the return on stock *i*. As a concrete example, think of *F* as the return on a market index (e.g.the S&P-500 or the FTSE-100), the variations in which cause variations in individual stock returns. Hence, this term causes movements in individual stock returns that are related. If two stocks have positive sensitivities to the factor, both will tend to move in the same direction.
2. The second term in the factor model is a random shock to returns, which is assumed to be uncorrelated across different stocks. We have denoted this term *åi* and call it the idiosyncratic return component for stock *i*. An important property of the idiosyncratic component is that it is also assumed to be uncorrelated with *F*, the common factor in stock returns. In statistical terms we can write the conditions on the idiosyncratic component as follows:

$$Cov(åi,\ åj) = 0\ i\ \text{``'}\ j\ Cov(åi,\ F) = 0\ i$$

An example of such an idiosyncratic stock return might be the unexpected departure of a firm's CEO or an unexpected legal action brought against the company in question. The partition of returns implied by equation 1 implies that all common variation in stock returns is generated by movements in *F* (i.e. the correlation between the returns on stocks *i* and *j* derives solely from *F*). As the idiosyncratic components are uncorrelated across assets they do not bring about covariation in stock price movements.

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WORK OUT MODEL

The economy in which the risk-free rate of return is 4% and the expected rate of return on the market index is 9%. The variance of the return on the market index is 20%. Two portfolios A and B have expected return 7% and 10% and variance 20% and 50%, respectively.

a) Work out the portfolios' beta coefficients.

According to the CAPM:

$E(r_A) = r_F + \beta_A [E(r_M) - r_F]$ and

$E(r_B) = r_F + \beta_B [E(r_M) - r_F]$.

Hence:

$\beta_A = [E(r_A) - r_F]/[E(r_M) - r_F] = (7\% - 4\%)/(9\% - 4\%) = 0.6$

$\beta_B = [E(r_B) - r_F]/[E(r_M) - r_F] = (10\% - 4\%)/(9\% - 4\%) = 1.2$.

b) The risk of a portfolio can be decomposed into market risk and idiosyncratic risk. What are the proportions of market risk and idiosyncratic risk for the two portfolios A and B?

From the market model:

$r_A = \alpha_A + \beta_A r_M + \varepsilon_A$

$r_B = \alpha_B + \beta_B r_M + \varepsilon_B$

with $cov(r_M, \varepsilon_A) = cov(r_M, \varepsilon_B) = 0$.

It hence follows that the variance of portfolio A's returns, σ^2_A, has two components, systematic and idiosyncratic risk:

$\sigma^2_A = \beta^2_A \sigma^2_M + \sigma^2_{\varepsilon A}$.

Similarly:

$\sigma^2_B = \beta^2_B \sigma^2_M + \sigma^2_{\varepsilon B}$.

The proportion of systematic risk for A is hence

$\beta^2_A \sigma^2_M / \sigma^2_A = (0.6)^2 * 20\% / 20\% = 36\%$.

The proportion of idiosyncratic risk for A is hence

$1 - [\beta^2_A \sigma^2_M / \sigma^2_A] = 64\%$.

The proportion of systematic risk for B is hence

$\beta^2_B \sigma^2_M / \sigma^2_B = (1.2)^2 * 20\% / 50\% = 58\%$

The proportion of idiosyncratic risk for B is hence

$1 - [\beta^2_B \sigma^2_M / \sigma^2_B] = 42\%$.

Portfolio B is much riskier than portfolio A as the variance of its returns is 50% compared with 20% for A. The main reason why it is riskier is that it is much more sensitive to the return of the market index than portfolio A as its beta is 1.2 compared with 0.6 for portfolio A.

c) Assume the two portfolios have uncorrelated idiosyncratic risk. What is the covariance between the returns on the two portfolios?

Cov(rA.rB) = Cov(áA +âA rM + åA, áB +âB rM + åB) = âA âB ó2M

= 0.6*1.2*20% = 4%.

The returns of portfolios A and B are hence (positively) correlated even though their idiosyncratic return components are not. These returns are positively correlated because they are positively correlated with the returns of the market index.

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MULTI-FACTOR MODELS

A generalisation of the structure presented in equation 3.1 posits k factors or sources of common variation in stock returns.

$$ri = ái + â1iF1 + â2iF2 + ... + âkiFk + åi \quad E(åi) = 0. \qquad \text{(Eq .2)}$$

Again the idiosyncratic component is assumed uncorrelated across stocks and with all of the factors. Further, we'll assume that each of the factors has a mean of zero. These factors can be thought of as representing news on economic conditions, financial conditions or political events. Note that this assumption implies that the expected return on asset i is just given by the constant in equation 3.2 (i.e. $E(ri) = ái$). Each stock has a complement of factor sensitivities or factor betas, which determine how sensitive the return on the stock in question is to variations in each of the factors.

A pertinent question to ask at this point is how do we determine the return on a portfolio of assets given the k-factor structure assumed? The answer is surprisingly simple: the factor sensitivities for a portfolio of assets are calculable as the portfolio weighted averages of the individual factor sensitivities. The following example will demonstrate the point.

Example

The returns on stocks X, Y, and Z are determined by the following two-factor model:

$$rX = 0.05 + F1 - 0.5F2 + åX$$

$$rY = 0.03 + 0.75\ F1 + 0.5F2 + åY$$

$$rz = 0.04 + 0.25\ F1 - 0.3F2 + åz$$

Given the factor sensitivities in the prior three equations, we wish to derive the factor structure followed by an equally weighted portfolio of the three assets (i.e. a portfolio with one-third of the weights on each of the assets). Following the result mentioned above, all we need to do is form a weighted average of the stock sensitivities on the individual assets. Subscripting the coefficients for the equally weighted portfolio with a p

we have:

$$áp = 1/3\ (0.05 + 0.03 + 0.04) = 0.04$$
$$â1p = 1/3\ (1 + 0.75 - 0.25) = 0.5$$
$$â2p = 1/3\ (-0.5 + 0.5 - 0.3) = -0.1;$$

and hence; the factor representation for the portfolio return can be written as:

$rp = 0.04 + 0.5F1 - 0.1F2 + \varepsilon p$

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where the final term is the idiosyncratic component in the portfolio return.

WORK OUT

Using the data given in the previous example, compute the return representation for a portfolio of assets X, Y and Z with portfolio weights –0.25, 0.5 and 0.75.

An important implication of the result is the following. Assume a twofactor model, and also assume that we are given the factor representations for three stocks. I can construct a portfolio of these three assets, which has any desired set of factor sensitivities through appropriate choice of the portfolio weights.1 What underlies this result? Well, to illustrate let's use the data from the prior example. Assume I wish to construct a portfolio with a sensitivity of 0.5 on the first factor and a sensitivity of 1 on the second factor. Denoting the portfolio weights on the individual assets by

$ùX$, $ùY$ and $ùZ$ it must be the case that:

$$ùX + 0.75ùY - 0.25ùZ = 0.5 \qquad \text{(Eq.3)}$$

$$-0.05ùX + 0.5ùY - 0.3ùZ = 1. \qquad \text{(Eq.4)}$$

In general, if I have a k-factor model I will need k+1 stocks todo this.

Finally, it must also be the case that the portfolio weights add up to unity, so we must lso satisfy the following equation:

$$ùX + ùY + ùZ = 1.$$

Equations 3, 4 and.5 are three equations in three unknowns, and we can find values for the portfolio weights which satisfy all three simultaneously. This illustrates the fact that (as the portfolio factor sensitivities were arbitrarily set at 0.5 and 1) we can derive any constellation of factor sensitivities. A particularly interesting case is when the portfolio is sensitive to one of the factors only. We call this a factor-replicating portfolio and discuss it below.

BROAD-BASED PORTFOLIOS AND IDIOSYNCRATIC RETURNS

In what follows we will assume that the basic securities that we're going to work with are themselves broad-based portfolios. The reason for this is that it allows us to lose the idiosyncratic risk terms associated with single stocks. Why is this the case? Well, consider the idiosyncratic risk term for an equally weighted portfolio of 100 stocks. Call the ith idiosyncratic term $ài$ and

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assume that all idiosyncratic terms have variance ó2. The variance of the idiosyncratic element of the portfolio return is then:

$$Var\ (_P) = Var\ (_ii100\ _=100) = 110000 Var\ (i1001\ _=_i)$$

$$= 10010000 = _2 = _2100$$

$$Var\ (_P) = Var\ (_ii1001\ _=100) = 110000 Var\ (i1001\ _=_i)$$

$$= 10010000 = _2 = _2100.$$

Note that, under these assumptions the variance of the idiosyncratic portfolio return is only one-hundredth of the variance of any individual asset's idiosyncratic return. In a general case, where one forms an equally weighted portfolio of n assets, the variance of the idiosyncratic term for the portfolio return is n-1ó2. This is a diversification result just like those we used in Chapter 2. The fact that the idiosyncratic returns are uncorrelated with oneanother means that their influence tends to disappear when one groups assets into large portfolios.

FACTOR-REPLICATING PORTFOLIOS

An important application of the technology developed previously in this chapter is the construction of factor-replicating portfolio. A factor-replicating portfolio is a portfolio with unit exposure to one factor and zero exposure to all others. For example, the portfolio replicating factor 1 in model 3.2 would have $\hat{a}1 = 1$ and $\hat{a}j = 0$ for all $j = 2$ to k.

Activity

Assume that stock returns are generated by a two-factor model. The returns on three well-diversified portfolios, A, B and C, are given by the following representations:

$$rA = 0.10\ F1 - 0.5F2$$

$$rB = 0.08 + 2F1 + F2$$

$$rC = 0.05 + 0.5F1 + 0.5F2.$$

Determine the portfolio weights you need to place on A, B and C in order to construct the two factor-replicating portfolios plus a portfolio which has zero exposure to both factors. What are the expected returns of the factor-replicating portfolios and what is the expected return of the risk-free portfolio?

The question to ask at this point is: why bother constructing factor replicating portfolios? The reason is as follows. Suppose I want to build a port-

folio that has identical factor exposures to a given asset, *X*. Assume a two-factor world and that asset *X* has exposure of 0.75 to factor 1 and –0.3 to factor 2. Assume also that I know the two factor-replicating portfolios.

Building a portfolio with the same factor exposures as *X* is now simple. Construct a new portfolio, *Y*, which has portfolio weight 0.75 on the replicating portfolio for the first factor, portfolio weight –0.3 on the replicating portfolio for the second factor and the rest of the portfolio weight (i.e. a weight of 1 – 0.75 + 0.3 = 0.55) on the risk-free asset. Via the results on the factor representations of a portfolio of assets and the definition of a factor-replicating portfolio it is easy to see that *Y* is guaranteed to have identical factor exposures to *X*.

The replication in the preceding paragraph forms the basis for the APT. For absence of arbitrage we require all assets with identical factor exposures to earn the same return. If they did not, then we would have the chance to make unlimited amounts of money. For example, assume that the expected return on the replicating portfolio *Y* was greater than that on asset *X*. Then I should short *X* and buy *Y*. The risk exposures of the two portfolios are identical and hence risks cancel out and I am left with an excess return that is riskless (i.e. an arbitrage gain).

In order to progress, let us introduce some notation. Denote the risk-free rate with *rf*. Denote the expected return on the *i*th factor-replicating portfolio with *rf* + *ëi* such that *ëi* is the risk premium associated with the *i*th factor. Again, for simplicity, assume that the world is generated by a two-factor model, and assume that I wish to replicate asset *X*, which has sensitivity *â*1X to the first factor and *â*2X to the second factor. Finally, we will assume that the primary securities being worked with are well diversified portfolios themselves. Hence, we will ignore any idiosyncratic risk in this derivation.

Using the prior argument, to replicate asset *X*'s factor sensitivities, we construct a portfolio with weight *â*1X on the first factor-replicating portfolio, weight *â*2X on the second factor-replicating portfolio and weight *1* – *â*1X – *â*2X on the risk-free asset. The expected return of the replicating portfolio is hence:

*â*1X (*rf* + *ë*1) + *â*2*X* (*rf* + *ë*2) + (1 – *â*1X – *â*2*X*) *rf* = *rf* + *â*1X *ë*1 + *â*2*X ë*2. (Eq .6)

Hence, using our factor-replicating portfolios we can write the expected return on a portfolio which replicates *X*'s factor exposures as the risk-free rate

plus each factor exposure multiplied by the risk premium on the relevant factor-replicating portfolio.

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Sample examination question

1. Assume that stock returns are generated by a two-factor model. The returns on three well-diversified portfolios, A, B and C, are given by the following representations:

$$rA = 0.10 + F1$$

$$rB = 0.08 + 2F1 - F2$$

$$rC = 0.05 - 0.5F1 + 0.5F2$$

a) Discuss what the factor representations above imply for the variation and comovement in the three stock returns. Show how the returns of the stocks should be correlated between themselves.

b) Find the portfolio weights that one must place on stocks A, B and C to construct pure tracking portfolios for the two factors (i.e. portfolios in which the loading on the relevant factor is +1 and the loadings on all other factors are 0).

c) If one was to introduce a new portfolio, D, with loadings of +1 on both of the factors, what would the expected return on D have to be to rule out arbitrage?

d) Explain the concepts of idiosyncratic risk and factor risk in the APT.

Criticism

Despite its theoretical importance, critics of MPT question whether it is an ideal investing strategy, because its model of financial markets does not match the real world in many ways.

Assumptions

The framework of MPT makes many assumptions about investors and markets. Some are explicit in the equations, such as the use of Normal distributions to model returns. Others are implicit, such as the neglect of taxes and transaction fees. None of these assumptions are entirely true, and each of them compromises MPT to some degree.

· Asset returns are (jointly) normally distributed random variables. In fact, it is frequently observed that returns in equity and other markets are not normally distributed. Large swings (3 to 6 standard deviations from the mean) occur in the market far more frequently than the normal distribution assump-

tion would predict.[8] While the model can also be justified by assuming any return distribution which is jointly elliptical,[9][10] all the joint elliptical distributions are symmetrical whereas asset returns empirically are not.

· Correlations between assets are fixed and constant forever. Correlations depend on systemic relationships between the underlying assets, and change when these relationships change. Examples include one country declaring war on another, or a general market crash. During times of financial crisis all assets tend to become positively correlated, because they all move (down) together. In other words, MPT breaks down precisely when investors are most in need of protection from risk.

· All investors aim to maximize economic utility (in other words, to make as much money as possible, regardless of any other considerations). This is a key assumption of the efficient market hypothesis, upon which MPT relies.

· All investors are rational and risk-averse. This is another assumption of the efficient market hypothesis, but we now know from behavioral economics that market participants are not rational. It does not allow for "herd behavior" or investors who will accept lower returns for higher risk. Casino gamblers clearly pay for risk, and it is possible that some stock traders will pay for risk as well.

· All investors have access to the same information at the same time. This also comes from the efficient market hypothesis. In fact, real markets contain information asymmetry, insider trading, and those who are simply better informed than others.

· Investors have an accurate conception of possible returns, i.e., the probability beliefs of investors match the true distribution of returns. A different possibility is that investors' expectations are biased, causing market prices to be informationally inefficient. This possibility is studied in the field of behavioral finance, which uses psychological assumptions to provide alternatives to the CAPM such as the overconfidence-based asset pricing model of Kent Daniel, David Hirshleifer, and Avanidhar Subrahmanyam (2001).[11]

· There are no taxes or transaction costs. Real financial products are subject both to taxes and transaction costs (such as broker fees), and taking these into account will alter the composition of the optimum portfolio. These assumptions can be relaxed with more complicated versions of the model.[*citation needed*]

· All investors are price takers, i.e., their actions do not influence prices.

In reality, sufficiently large sales or purchases of individual assets can shift market prices for that asset and others (via cross-elasticity of demand.) An investor may not even be able to assemble the theoretically optimal portfolio if the market moves too much while they are buying the required securities.

- Any investor can lend and borrow an unlimited amount at the risk free rate of interest. In reality, every investor has a credit limit.
- All securities can be divided into parcels of any size. In reality, fractional shares usually cannot be bought or sold, and some assets have minimum orders sizes.

More complex versions of MPT can take into account a more sophisticated model of the world (such as one with non-normal distributions and taxes) but all mathematical models of finance still rely on many unrealistic premises.

8.1.9 ACTIVITIES IN PORTFOLIO MANAGEMENT

Portfolio management is also known as investment management which consists of managing the investment securities options. There are seven main activities in portfolio management. They are:

1. Laying down the objectives of investment and the difficulties involved in it
2. Choosing the asset mix
3. Portfolio strategy formulation
4. Securities selection
5. Execution of portfolio
6. Revision of portfolio and
7. Evaluation of performance.

1. Laying down the objectives of investment and the difficulties involved in it

The two main objectives of any investment would be the expectation regarding returns and the ability of the investor to assume a level of risk. Investors would aim to achieve a steady income involving growth and higher returns. Risk levels could be conservative, moderate or aggressive. Risk and returns are directly related. More the risk, the more would be the returns and lower the risk, lower would be the returns. The difficulties or constraints in laying down the objectives of investment could be related to liquidity requirements of the investor, investment horizon, post-tax returns, law and regulations of the country and his personal circumstances.

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2. Choosing the asset mix

The second activity in portfolio management is to decide the proportion of the various asset categories in the investor's portfolio. The various asset categories include bonds and debentures, stocks, cash investments, precious metals like gold and silver, investment in real estate etc. Investments are aimed at various purposes like education to build human capital, purchase of house, meeting medical & sustaining expenses etc. The choice of proper asset mix will be based upon the expectation of returns and the risk perception of the investor.

3. Portfolio strategy formulation

After the choice of asset mix is done, the next step for the investor is to formulate a portfolio strategy. Active portfolio strategy and passive portfolio strategy are the two broad choices that are available to formulate. An active portfolio strategy involves professionals in investments and investors who are aggressive to get higher returns and earnings. Passive portfolio strategy involves creating a well-diversified portfolio, the risk of which is pre-determined and holding the portfolio unaltered over a period of time.

4. Securities selection

The selection of debt securities like debentures and bonds have to be evaluated considering the factors like yield to maturity, default risk, tax shield and liquidity. The selection of equity shares involves technical, fundamental and random analysis. These analyses are aimed at price behavior, volume of trading, trend, level of earnings, growth prospects, risk exposure, prevailing stock price etc.

5. Execution of portfolio

After the formulation of investment objectives, choosing asset mix, formulating portfolio strategy and selection of securities, the portfolio has to be executed by buying or selling transactions or both. A proper understanding and knowledge of trading game, trade motivation, nature of key players in the market, likely losers and winners etc. will aid in this respect.

6. Revision of portfolio

The portfolio thus executed after formulation has to be reviewed and monitored periodically. This is essential because the risk-return levels of the various securities in the portfolio would have altered over time, the objectives of the investor would have changed, risk perception of the investor would have changed and the targets would have drifted away. The revision of portfo-

lio involves portfolio re-balancing and portfolio upgrading.

7. Evaluation of performance

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The evaluation of performance is with respect to the rate of return and risk. It involves measuring the returns generated, risk adhered to and the overall performance of the portfolio. These are discussed in subsequent chapters.

8.2 THE CAPITAL ASSET PRICING MODEL

8.2.1 THE CAPM AND ITS ASSUMPTIONS

The capital asset pricing model (CAPM) is a *set* of predictions concerning equilibrium expected re-turns on risky assets. Harry Markowitz laid down the foundation of modern portfolio man-agement in 1952. The CAPM was developed 12 years later in articles by William Sharpe (1964), John Lintner (1965), and Jan Mossin (1966). The time for this gestation indicates that the leap from Markowitz's portfolio selection model to the CAPM is not trivial.

We summarize the simplifying assumptions that lead to the basic version of the CAPM in the following list. The fundamental idea is that individuals are as alike as possible, with the notable exceptions of initial wealth and risk aversion. We will see that conformity of investor behaviour vastly simplifies our analysis.

1. There are many investors, each with an endowment (wealth) that is small compared to the total endowment of all investors. Investors are *price-takers*, in that they act as though security prices are unaffected by their own trades. This is the usual perfect competition assumption of microeconomics.
2. All investors plan for one identical holding period. This behavior is *myopic* (short--sighted) in that it ignores everything that might happen after the end of the single-period horizon. Myopic behavior is, in general, suboptimal.
3. Investments are limited to a *universe* of publicly traded financial assets, such as stocks and bonds, and to risk-free borrowing or lending arrangements. It is assumed also that investors may borrow or lend any amount at a fixed, risk-free rate.
4. Investors pay *no* taxes on returns and no transaction costs (commissions and service charges) on trades in securities. (In reality, of course,

we know that investors are in different tax brackets and that this may govern the type of assets in which they invest. In such a simple world, investors will not care about the difference between returns from capital gains and those from dividends.) Furthermore, actual trading is costly, and commissions and fees depend on the size of the trade and the good standing of the individual investor.

5. All investors are *rational* mean-variance optimizers, meaning that they all use the Markowitz portfolio selection model to construct efficient frontier portfolios.
6. All investors analyse securities in the same way and share the same economic view of the world. The result is *identical* estimates of the probability distribution of future cash flows from investing in the available securities; that is, for any set of security prices they all derive the same input list to feed into the Markowitz model. Given a set of security prices and the risk-free interest rate, all investors use the same expected returns, standard deviations and correlations to generate the efficient frontier and the unique optimal risky portfolio. This assumption is often referred to as homogeneous expectations or beliefs.

These assumptions represent the "if" of our "what if" analysis. Obviously, they ignore many real-world complexities, With these assumptions, however, we can gain some powerful insights into the nature of equilibrium in security markers.

We can summarize the equilibrium that will prevail in this hypothetical world of securities and investor briefly in the following way:

1. One of the most important *implications* of the CAPM is that all investors will choose to hold a portfolio of risky assets in proportions that duplicate representation of the assets in the market portfolio (*M*), which includes all traded assets. For simplicity, we generally refer to all risky assets as stocks.
2. *Not only* the market portfolio be on the efficient frontier but it also will be the tangency portfolio to the optimal capital allocation line (CAL) derived by each and every investor. As a result, the capital market line (CML), the line from the risk-free rate through the market portfolio, *M*, is also the best attainable capital allocation line. All investors hold *M* as their optimal risky portfolio, differing only in the amount invested in it versus in the risk free asset.

3. The risk premium on the market portfolio will be proportional to its risk (standard deviation) and the degree of risk aversion of the typical investor. Note that because M is the optimal portfolio, which is efficiently diversified across all stocks, standard deviation (s^2_M) is the systematic risk of this universe.
4. The risk premium on individual assets will be proportional to the risk premium on the market portfolio, *M*, and the *beta* coefficient of the security relative to the market portfolio. Beta measures the extent to which returns on stock and the market move together.

8.2.2. Why Do All Investors Hold the Market Portfolio?

What is the market portfolio? When we sum over, or aggregate, the portfolios of all indi-vidual investors, lending and borrowing will cancel out (because each lender has a corre-sponding borrower), and the value of the *aggregate* risky portfolio will equal the entire wealth of the economy. This is the market portfolio, *M*. The proportion of each stock in this portfolio equals the market value of the stock (price per share times number of shares outstanding) divided by the sum of the market values of all stocks. The CAPM implies that as individuals attempt to *optimize* their personal portfolios, they each arrive at the same portfolio, with weights on each asset equal to those of the market portfolio.

Given the assumptions of the previous section, it is easy to see that all investors will desire to hold identical risky portfolios. If all investors use identical Markowitz analysis (Assumption 5), applied to the same universe of securities (Assumption 3) for the same time horizon (Assumption 2) and use the same input list (Assumption 6), they all must arrive at the same composition of the optimal risky portfolio, the portfolio on the efficient frontier identified by the tangency line from T-bills (the risk-free rate) to that frontier, as in Figure 9.1 in the textbook. A price adjustment process guarantees that all stocks will be included in the optimal portfolio. It shows that all assets have to be included in the market portfolio. The only issue is the price at which investors will be willing to include a stock in their optimal risky portfolio.

8.2.3. The Passive Strategy is Efficient

In Chapter 6 we defined the CML as the capital allocation line (CAL) that is constructed from a money market account (or T-bills) and the market portfolio. In this scenario, the market portfolio that all investors hold is based on the common *input* list, thereby incorporating all relevant information about

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the universe of securities. This means that the investor can skip the trouble of doing security analysis and obtain an efficient portfolio simply by holding the market portfolio, *M*. Thus the passive strategy of investing in a market index portfolio is efficient. (A passive investor who takes a free ride by simply investing in the market portfolio benefits from the efficiency of that portfolio. In fact, an active investor who choses any other portfolio will end on a CAL that is less efficient than the CML used by passive investor).

For this reason, we sometimes call this result a mutual fund theorem because it implies that only one mutual fund of risky assets – market portfolio – is sufficient to satisfy the investment demands of all investors. The mutual fund theorem is another *incarnation* of the separation property discussed in Chapter 7. Assuming that all investors choose to hold a market index mutual fund, we can separate portfolio selection into two components: 1) a technical problem, in which an efficient mutual find is created by professional man-agers, and 2) a personal problem, in which an investor's risk aversion determines the allocation of the *complete* portfolio between the mutual fund and risk-free assets. Here, all investors agree that the mutual fund they would like to hold is the market portfolio.

The logical inconsistency of the CAMP is this: If a passive strategy is costless and efficient, why would anyone follow an active strategy? But if no one does any security analysis, what brings about the efficiency of the market portfolio?

8.2.4. The Risk Premium of the Market Portfolio

In Chapter 6 we discusseJ how individual investors go about deciding how much to invest in the risky portfolio. Returning now to the decision of how much to invest in portfolio *M* versus in the risk free asset, what can we deduce about the *equilibrium* risk premium of portfolio *M*? We asserted earlier that the equilibrium risk premium on the market portfolio will be proportional to the average degree of risk aversion of the investor population and the risk of the market portfolio. Now we can explain this result. Recall that each individual investor chooses a proportion y, allocated to the optimal portfolio *M*, such that:

$$y = \frac{E(r_M) - r_f}{A\sigma_M^2}$$

In the simplified CAPM economy, risk-free investments involve borrow-

ing and lending among investors. Any borrowing position must be *offset* by the lending position of the creditor. This means that net borrowing and lending across all investors must be zero, and in consequence, substituting the representative investor's risk aversion $\bar{A}$, for A, the average position in the risky portfolio is 100%, or $\bar{y} = 1$. Setting $y = 1$ in equation (1) and rearranging, we find that the risk premium on the market portfolio is re-lated to its variance by the average degree of risk aversion:

$$E(r_M) - r_f = \bar{A}\sigma_M^2$$

In equilibrium, of course, the risk premium on the market portfolio must be just high enough to induce investors to hold the average supply of stocks. If the risk premium is too high compared to the average degree of risk aversion, there will be excess demand for securities, and prices will rise; if it is too low, investors will not hold enough stocks to absorb the supply, and the prices will fall. The *equilibrium* risk premium of the market portfolio is therefore proportional to both the risk of the market, as measured by the variance of its returns, and to the degree of risk aversion of the average investor, A, in the above equation.

8.2.5. Expected Returns on Individual Securities

Remember that all investors use the same input list, that is, the same estimates of expected returns, variances, and covariances. We saw in Chapter 7 that these covariances can be arranged in a covariance *matrix*, so that the entry in the fifth row and third column for example, would be the covariance between the rates of return on the fifth and third securities. Each diagonal entry of the matrix is the covariance of one security's return with itself, which is simply the variance of that security.

To calculate the variance of the market portfolio we use the *bordered* covariance matrix with the market portfolio weights, as discussed in Chapter 7. Recall that we calculate the variance of the portfolio by summing over all the elements of the covariance matrix, first multiplying each element by the portfolio weights from the row and the column. The contribution of one stock to portfolio variance therefore can be ex-pressed as the sum of all the covariance terms in the column corresponding to the stock, where each covariance is first multiplied by both the stock's weight from its row and the weight from its column.

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For example, the covariance of GE stock to the variance of the market portfolio is:

$$w_{GE}[w_1 Cov(r_1, r_{GE}) + w_2 Cov(r_2, r_{GE}) + \ldots + w_{GE} Cov(r_{GE}, r_{GE}) + \ldots + w_n Cov(r_n, r_{GE})] \quad (3)$$

The *best* measure of the stock's contribution to the risk of the market portfolio is its covariance with that portfolio. Thus, the GE's stock contribution to the market portfolio's variance is:

$$GE\ contribution = w_{GE} Cov(r_{GE}, r_M)$$

To demonstrate this more rigorusly, note that the rate of return on the market portfolio may be written as:

$$r_M = \sum_{k=1}^{n} w_k r_k$$

Therefore, the covariance of the return on GE with the market portfolio is:

$$Cov(r_{GE}, r_M) = Cov(r_{GE}, \sum_{k=1}^{n} w_k r_k) = \sum_{k=1}^{n} w_k Cov(r_{GE}, r_k) \quad (4)$$

Notice that the last term in equation (4) is precisely the same as the term in brackets in equation (3). Therefore, equation (3), which is the contribution of GE to the variance of the market portfolio, may be simplified to $w_{GE} Cov(r_{GE}, r_M)$. We also observed that the contribution of our holding of GE to the risk premium of the market portfolio is $w_{GE}[E(r_{GE}) - r_f]$. Having measured the contribution of GE stock to market portfolio variance, we may determine the appropriate risk premium for GE. We note first that the market portfolio is the tangency (efficient mean-variance) portfolio. The reward-to-risk ratio for investment in the market portfolio is:

$$\frac{Market\ risk\ premium}{Market\ variance} = \frac{E(r_M) - r_f}{\sigma_M^2}$$

The ratio in equation (5) is often called the market price of risk, because it quantifies the extra return that investors demand to bear portfolio risk. The ratio of risk premium to variance tells us how much *extra* return must be earned per unit of portfolio risk. (Notice that for components of the efficient portfolio, such as shares of GE, we measure risk as the contribution to portfolio variance (which depends on its *covariance* with the market). In contrast, for the efficient portfolio itself, its variance is the appropriate measure of risk).

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Now, consider an average investor who is currently invested 100% in the market portfolio and suppose she were to increase her position in the market portfolio by a *tiny* fraction, *d*, financed by borrowing at the risk-free rate of return. The portfolio rate of return will be $r_M + \delta(r_M - r_f)$. Taking expectations and comparing with the original expected return, $E(r_M)$, the incremental rate of return will be:

$$\Delta E(r) = \delta[E(r_M) - r_f]$$

To measure the impact of the portfolio shift on risk, we compute the new value of the portfolio variance. The new portfolio has a weight of (1 + *d*) in the market and (-*d*) in the free-risk asset. The portfolio variance will increase by:

$$\Delta\sigma^2 = (1+\delta)^2\sigma_M^2 = \sigma_M^2 + (2\delta + \delta^2)\sigma_M^2$$

However, if *d* is very small, then d^2 will be negligible compared to 2*d*, so we may ignore the term. Therefore, the portfolio variance has increased by $2\delta\sigma_M^2$. Summarizing these results, the trade-off between the incremental risk premium and incremental risk, referred to as the marginal price of risk, is given by the ratio:

$$\frac{\Delta E(r)}{\Delta\sigma^2} = \frac{E(r_M) - r_f}{2\sigma_M^2}$$

and equals one-half the market price of risk (see the equation of reward-to-risk ratio). Now suppose that, instead, investors were to invest the increment *d* in GE stock. The increase in mean excess return is:

$$\Delta E(r) = \delta[E(r_{GE}) - r_f]$$

This portfolio has a weight of 1.0 in the market, *d* in GE and (-*d*) in the risk-free asset. The *increase* in variance includes the variance of the incremental position in GE plus twice its covariance with the market:

$$\Delta\sigma^2 = \delta^2\sigma_{GE}^2 + 2\delta Cov(r_{GE}, r_M)$$

Dropping the negligible term involving d^2, the marginal price of risk of GE is:

$$\frac{\Delta E(r)}{\Delta\sigma^2} = \frac{E(r_{GE}) - r_f}{2Cov(r_{GE}, r_M)}$$

A basic principle of equilibrium is that all investments should offer the

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same reward-to-risk ratio. (If the ratio were better for one investment than another, investors would rearrange their portfolio, tilting toward the alternative with better trade-off and shying way from the other. Such activity would impart pressure on security prices until the ratios were equalized.) Therefore, we may conclude that, in equilibrium, the marginal price of risk of GE stock must equal that of the market portfolio.

$$\frac{E(r_{GE})-r_f}{2Cov(r_{GE},r_M)}=\frac{E(r_M)-r_f}{2\sigma_M^2}$$

To determine the fair risk premium of GE stock, we rearrange the above equation slightly to obtain:

$$E(r_{GE})-r_f=\frac{Cov(r_{GE},r_M)}{\sigma_M^2}[E(r_M)-r_f]$$

The ratio $Cov(r_{GE},r_M)/\sigma_M^2$ on the right-hand side of equation (8) measures the *contribution* of GE stock to the variance of the market portfolio as a fraction of the total variance of the market portfolio. The ratio is called beta and is denoted by *â*. Using this measure, we can restate the previous equation as

$$E(r_{GE})=r_f+\beta_{GE}[E(r_M)-r_f]$$

This expected return-beta relationship is the most familiar expression of the CAPM to practitioners. We will have a lot more to say about the expected return-beta relationship shortly.

Does the fact that few real-life investors actually hold the market portfolio imply that the CAPM is of no practical importance? Not necessarily. Recall from Chapter 7 that reasonably well-diversified portfolios shed firm-specific risk, and are left with mostly systematic or market risk. Even if one doesn't hold the precise market portfolio, a well-diversified portfolio will be so highly correlated with the market that a stock's beta relative to the market will still be a useful risk measure. In fact, several authors have shown that modified versions of the CAPM will hold true even if we consider differences among individuals leading them to hold different portfo-lios. For example, Brennan (1973) examined the impact of differences in investors' personal tax rates on market equilibrium, and Mayers (1972) looked at the impact of non-traded assets such as human capital (earning power). Both found that although the

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market portfolio is no longer each investor's optimal risky portfolio, the expected return-beta relationship should still hold in a somewhat modified form.

If the expected return-beta relationship holds for any individual asset, it must hold for any combination of assets.

$$E(r_P) = r_f + \beta_P[E(r_M) - r_f]$$

where $E(r_P) = \sum_k w_k E(r_k)$ is the expected return on the portfolio, and $\beta_P = \sum_k w_k \beta_k$ is the

portfolio beta. Incidentally, this result has to be true for the market portfolio itself. If the market beta is 1, and the market is a portfolio of all assets in the economy, the weighted average beta of all assets must be 1. Hence, betas greater that 1 are considered *aggressive* in that investment in high-beta stocks entails above-average sensitivity to market swings. Betas below 1 can be described as *defensive*.

8.2.6 The CAPM and the Index Model

The CAPM is an elegant model. The question is whether it has real-word value – whether its implications are borne out by experience. Consider that CAPM treats all traded risky assets. To test the efficiency of the CAPM market portfolio, we would need to construct a value-weighted portfolio of a huge size and test its efficiency. So far, this task has not been feasible. An even more difficult problem, however, is that the CAPM implies relationships among *expected* returns, whereas all we can observe are actual or realized holding-period returns, and these need not equal prior expectations. Even supposing we could construct a portfolio to represent the CAPM market portfolio satisfactorily, how would we test its mean-variance efficiency?

1. The Index Model and Realized Returns

We have said that the CAPM is a statement about *ex-ante* or expected returns, whereas in practice all anyone can observe directly are *ex-post* or realized returns. To make a leap from expected to realized returns, we can employ the index model, which we presented in excess return format.

$$R_i = \alpha_i + \beta_i R_M + e_i$$

We saw in Chapter 8 how to apply standard regression analysis to estimate equation (10) using observable realized returns over some sample period. Let us now see how this framework for statistically decomposing actual stock returns meshes with the CAPM.

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We start by deriving the covariance between the returns on stock *i* and the market index. By definition, the firm-specific or non-systematic component is independent of the market-wide or systematic component, that is, Cov(R_M, e_i) = 0. From this relationship it follows that the covariance of the excess rate of return on security *i* with that of the market index is:

$$\begin{aligned} Cov(R_i, R_M) &= Cov(\beta_i R_M + e_i, R_M) = \\ &= \beta_i Cov(R_M, R_M) + Cov(e_i, R_M) \\ &= \beta_i \sigma_M^2 \end{aligned}$$

Because $Cov(R_i, R_M) = \beta_i \sigma_M^2$, the sensitivity coefficient, $\hat{a}_i$, in equation (10), which is the slope of the regression line representing the index model, equals:

$$\beta_i = \frac{Cov(R_i, R_M)}{\sigma_M^2}$$

The index model beta coefficient turns out to be the same beta as that of the CAPM ex-pected return-beta relationship, except that we replace the (theoretical) market portfolio of the CAPM with the well-specified and observable market index.

2. The Index Model and the Expected Return-Beta Relationship

Recall that, according to CAPM, the excess rate of return on any security *i* is given by:

$$E(r_i) - r_f = \beta_i [E(r_M - r_f)]$$

where $\beta_i = Cov(R_i, R_M)/\sigma_M^2$. This is a statement about the mean, or expected excess returns of assets relative to the mean excess return of the (theoretical) market portfolio. If the index M in equation (10) represents the true market portfolio, we can take the expectations of each side of the equation to show that the index model specification is:

$$E(r_i) - r_f = \alpha_i + \beta_i [E(r_M - r_f)]$$

A comparison of the index model relationship to the CAPM expected return-beta rela-tionship (see above) shows that the CAPM predicts that $\acute{a}_i$ should be zero for all assets. The *alpha* of a stock is its expected return in excess of (or below) the fair expected return as predicted by the CAPM. If the stock is fairly priced, its alpha must be *zero*.

We emphasise again that this is a statement about expected returns on a security.

After the fact, of course, some securities will do better or worse than expected and will have higher or lower than predicted by the CAPM; that is, they will exhibit positive or negative alphas over a sample period. But this superior or inferior performance could not have been forecast in advance. Therefore, if we estimate the index model for several firms, using equation (10) as a regression equation, we should find that the ex-post or realised alphas (the regression intercepts) for the firms in our sample center around zero. If the initial expectation for alpha were zero, as many firms would be expected to have a positive as a negative alpha for some sample period.

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The CAPM states that the expected value of alpha is zero for all se-curities, whereas the index model representation of the CAPM holds that the realized value of alpha should average out to zero for a sample of historical observed returns. Just as important, the sample alphas should be unpredictable, that is, independent from one sample period to the next.

There is yet another applicable variation on the intuition of the index model, the mar-ket model. Formally, the market model states that the return "*surprise*" of any security is proportional to the return "*surprise*" of the market, plus a firm-specific surprise:

$$r_i - E(r_i) = \beta_i[r_M - E(r_M)] + e_i$$

This equation divides returns into firm-specific and systematic components somewhat differently from the index model. If the CAPM is valid, however, you can see that, sub-stituting for $E(r_i)$ from the CAPM equation, the market model becomes identical to the index model. For this reason the terms "index model" and "market model" are used interchangeably.

8.2.7 Is the CAPM Practical?

To discuss the role of the CAPM in real-life investments we have to answer two questions. First, even if we all agree that the CAPM were the best available theoretical model to explain rates of return on risky assets, how would this affect practical investment policy? Second, how can we determine whether the CAPM is in fact the best available model to explain rates of return on risky assets?

Under the assumption that the CAPM is the best available model, investors willing to expend resources to construct a superior portfolio must (1) identify a practical index to work with and (2) deploy macro analysis to obtain

good forecasts for the index and security analysis to identify mispriced securities.

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Is the CAPM Testable?

The CAPM implications are embedded in two predictions: 1) the market portfolio is efficient, and 2) the security market line (the expected return-beta relationship) accurately describes the risk-return trade-off, that is, alpha values are zero. The central problem in testing these predictions is that the hypothesized market portfolio is unobservable. The "market" portfolio includes *all* risky assets that can be help by investors. This is far more extensive than an equity index. It would include bonds, real estates, foreign assets, privately held businesses and human capital. These assets are often traded thinly or (for example, in case of human capital) not traded at all. It is difficult to test the efficiency of an observable portfolio, let alone an unobservable one. These problems alone make adequate resting of the model infeasible.

8.2.8 EXTENTIONS OF THE CAPM

There are two classes of *extensions* to the simple version of the CAPM. The first at-tempts to relax the assumptions that we outlined at the outset of the chapter. The second ac-knowledges the fact that investors worry about sources of risk other than the uncertain value of their securities, such as unexpected changes in relative prices of consumer goods.

1. The CAPM with Restricted Borrowing: The Zero-Beta Model

The CAPM is predicated on the assumption that all investors share an identical input list that they feed into the Markovitz model. Thus all investors agree on the location of the efficient (minimum-variance) frontier, where each portfolio has the lowest variance among all feasible portfolios at a target expected rate of return. When all investors can borrow and lend at the risk-free rate, r_f, all agree in the optimal tangency portfolio and choose to hold a share of the market portfolio.

When investors no longer can borrow at a common risk-free rate, they may choose risky portfolios from the entire set of efficient frontier portfolios according to how much risk they choose to bear. The market portfolio is no longer the common optimal risky portfolio. In fact, with investors choosing different portfolios, it is no longer obvious whether the market portfolio, which is the aggregate of all investors' portfolios, will even be on the efficient frontier. If the market portfolio is *no longer* mean-variance efficient, then the expected return-beta relationship of the CAPM will no longer characterize market equilibrium.

Efficient frontier portfolios have a number of interesting characteristics, independently derived by Robert Merton (1972) and Richard Roll (1977). Equilibrium expected return-beta relationship in the case of restrictions on risk-free investment has been developed by Fisher Black (1972). Black's model of the CAPM in the absence of a risk-free asset rests on the fol-lowing three properties of mean-variance efficient portfolios:

1. Any portfolio constructed by combining two frontier portfolios is itself on the efficient frontier.
2. The expected return of any asset can be expressed as an exact linear function of the expected return on any two frontier portfolios. Consider, for example, the minimum-variance frontier portfolios P and Q. Black showed that the expected return on any asset i can be expressed as

   1. Every portfolio on the efficient frontier, except for the global minimum-variance portfolio, has a "companion" portfolio on the bottom (inefficient) part of the frontier with which it is *uncorrelated*. Because it is uncorrelated, the companion portfolio is referred to as the zero-beta portfolio of the efficient portfolio.

$$E(r_i) - E(r_Q) = [E(r_P) - E(r_Q)]\frac{Cov(r_i, r_P) - Cov(r_P, r_Q)}{\sigma_P^2 - Cov(r_P, r_Q)}$$

Note that Property 2 has nothing to do with market equilibrium. It is a purely mathematical property relating frontier portfolios and individual securities. In this case, at least some investors will choose portfolios on the efficient frontier that are not necessarily the market index portfolio. Because the average returns on the zero-beta portfolio are *greater* than observed T-bill rates, the zero-beta model can explain why average estimates of alpha values are positive for low0beta securities, and negative for high-beta securities, contrary to the prediction of the CAPM.

With these three properties, the Black model can be applied to any of several variations: no risk-free asset at all, risk-free lending but no risk-free borrowing, and borrowing at a rate higher than r_f

Let us see how the model works for the case with risk-free lending but no borrowing. Imagine an economy with only two investors, one relatively risk averse and one risk tolerant. The risk-averse investor will choose a port-

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folio on the CAL supported by portfolio *T*, that is, she will mix the portfolio *T* with lending at the risk-free rate. The risk-tolerant investor is willing to accept more risk to earn a higher risk premium; she will choose portfolio *S*. This portfolio lies along the efficient frontier with higher risk and return than portfolio *T*. The aggregate market portfolio (i.e., the *market* portfolio, *M*) will be a combination of *T* and *S*. Since these two portfolios are each on the efficient frontier, so is *M* (from Property 1).

From Property 3, the market portfolio *M*, has a companion zero-beta portfolio on the minimum-variance frontier, *Z(M)*. Moreover, by Property 2, we can express the return of any security in terms of *M* and *Z(M)* as in equation (11). But, since, by construction $\mathrm{Cov}(r_M, r_{Z(M)}) = 0$, the expression simplifies to:

$$E(r_i) - E(r_{Z(M)}) = [E(r_M) - E(r_{Z(M)})]\frac{Cov(r_i, r_M)}{\sigma_M^2} = \beta_i[E(r_M) - E(r_{Z(M)})]$$

where *P* in equation (11) has been replaced by *M*, and *Q* has been replaced by *Z(M)*. The last equation can be interpreted as a variant of the simple CAPM, in which r_f were replaced with $E[r_{Z(M)}]$.

2. Lifetime Consumption and the CAPM

One of the restrictive assumptions for the simple version of the CAPM is that investors are *myopic* – they plan for one common holding period. Eugene Fama (1970) showed that, even if we extend our analysis to a multi-period setting, the single-period CAPM still may be appropriate. The key assumptions that Fama used to replace myopic planning horizons are that investor preferences are unchanging over time and the risk-free interest rate and probability distribution of security returns do not change unpredictably over time. Of course, this latter assumption is also unrealistic.

Robert Merton (1992) – Nobel prize winner thanks to his contribution to option-pricing theory and financial engineering) – also relaxes the single-period myopic assumptions about investors. He envisions individuals who optimize a lifetime consumption/investment plan and who continuously adapt consumption /investment decisions to current wealth and planned retirement age. When uncertainty about portfolio returns is the only source of risk and investment opportunities remain unchanged through time, that is, there is no change in the probability distribution of the return on the market portfolio or

individual securities, Merton's so-called intertemporal capital asset pricing model (ICAPM) predicts the same expected return-beta relationship as the single-index equation.

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3. A Consumption-Based CAPM

Models that are centered directly on consumption were first proposed by Rubinstein (1976), Lucas (1978) and Breeden (1979). The center place in these models is the so called consumption-tracking portfolio (also called consumption-mimicking portfolio), that is, the portfolio with the highest correlation with consumption growth. This portfolio in the CCAPM plays the role of the market portfolio in the conventional CAPM. This is in accord with its focus on the risk of consumption opportunities rather than the risk and return of the dollar value of the portfolio. The excess return on the consumption-tracking portfolio plays the role of the excess return on the market portfolio. Both approaches result in linear, single-factor models that differ mainly in the identity of the factor they use.

4. The CAPM and Liquidity

Liquidity refers to the cost and ease with which an asset can be converted into cash, that is, sold. Part of liquidity is the *cost* of engaging in a transaction, particularly, the bid-ask spread. Another part is *price* impact – the adverse movement in the price one would encounter when attempting to execute a larger trade. Yet another component is *immediacy* – the ability to sell the asset quickly without reverting to fire-sale prices. Conversely, illiquidity can be measured in part by the discount from fair market value a seller must accept if the asset is to be sold quickly. A perfectly liquid asset is one that would entail no illiquidity discount.

Traders have long recognized the importance of the liquidity, and some evidence suggests that liquidity can reduce market price substantially. A rigorous treatment of the value of the liquidity was developed by Amihud and Mendelson (1986). Recent studies show that liquidity plays an important role in explaining rates of return on financial assets.

Recall assumption 4 of the CAPM, that all trading is costless. In reality, no security is perfectly liquid, in that all trades involve some transaction cost. Investors prefer more liq-uid assets with lower transaction costs, so it should not surprise us to find that all else equal, relatively illiquid assets trade at lower prices or, equivalently, that the expected re-turn on illiquid assets must be higher. Therefore, an illiquidity premium must be impounded into the price of each asset.

Let us assume that there are only two classes of securities: liquid and illiquid. The liquidation cost (c_L) of a class L (more liquid) stock to an investor with a horizon of '*h*' years (a Type *h* investor) will reduce the per-period rate of return by c_L/h%. Class I (illiquid) assets have higher liquidation costs (c_I) that reduce the per-period return by c_I/h%, where c_I is greater then c_L. Therefore, if you intend to hold a class L security for *h* periods, your expected rate of return net of transaction costs is $E(r_L) - c_L/h$. Similarly, for class I assets expected rate of return net of transaction costs is $E(r_I) - c_I/h$. There is no liquation cost on T-bills.

Recalling that the expected gross return on class *L* (liquid) stocks is $r_L = r + c_L x$, where c_L is one-period liquidation cost, and *r* is the expected rate of return, we may conclude that the illiquidity premium of class *I* (illiquid) versus class *L* (liquid) stocks is:

$$r_I - r_L = \frac{1}{h_{L,I}}(c_I - c_L)$$

where $h_{L,I}$ is the investment horizon

Similarly, we can derive the **liquidity premium** of class *L* stock over T-bills as:

$$r_L - r = \frac{1}{h_L} c_L$$, where h_L is the investment horizon

Our analysis so far has focused on the case of uncorrelated assets, allowing us tò ignore issues of systematic risk. This special case turns out to be easy to generalize. If we were to allow for correlation among assets due to common systematic risk factors, we would find that the illiquidity premium is simply *additive* to the risk premium of the usual CAPM. Therefore, we can generalize the CAPM expected return-beta relationship to include a liq-uidity effect as follows:

$$E(r_i) - r_f = \beta_i[E(r_M) - r_f] + f(c_i)$$

where $f(c_i)$ is a function of trading costs that measures the effect of the illiquidity premium given the trading costs of security *i*. We can see that $f(c_i)$ is increasing with c_i but at a de-creasing rate. The usual CAPM equation is modified because each investor's optimal port-folio is now affected by liquidation cost as well as risk-return considerations.

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Another version of this model is developed by Acharya and Pederson (2005) who consider the impacts of both the level and the risk of liquidity on security pricing. They include three components of liquidity risk – each captures the extent to which liquidity varies systematically with other market conditions. They identify three relevant "liquidity" betas, which measure in turn 1) the extent to which the stock's illiquidity varies with market illiquidity; 2) the extent to which the stock's return varies with market illiquidity; and 3) the extent to which the stock's illiquidity varies with the market return. Therefore, expected return depends on expected liquidity, as well as the conventional CAPM beta, and three additional liquidity-related betas:

$$E(r_i) = kE(C_i) + \lambda(\beta + \beta_{L,1} - \beta_{L,2} - \beta_{L,3})$$

where

$E(C_i)$ = expected cost of illiquidity;

k = adjustment for average holding period over all securities;

l = market risk premium net of average market illiquidity cost, that is, $E(R_M - C_M)$;

β = measure of the systematic market risk;

$b_{L,(1)(2)(3)}$ = liquidity betas.

Compared to the conventional CAPM, the expected return-beta equation now has a predicted firm-specific component that accounts for the effect of security liquidity. Such an effect would appear to be an alpha in the conventional index model.

8.3 PORTFOLIO MANAGEMENT SCAFFOLD

The art and science of making decisions about investment mix and policy, matching investments to objectives, asset allocation for individuals and institutions, and balancing risk against the performance.

Portfolio management is all about strengths, weaknesses, opportunities and threats in the choice of debt vs. equity, domestic vs. international, growth vs. safety, and many other tradeoffs encountered in the attempt to maximize return at a given appetite for risk.

In the case of mutual and exchange-traded funds (ETFs), there are two forms of portfolio management: passive and active. Passive management simply tracks a market index, commonly referred to as indexing or index investing. Active management involves a single manager, co-managers, or a

team of managers who attempt to beat the market return by actively managing a fund's portfolio through investment decisions based on research and decisions on individual holdings. Closed-end funds are generally actively managed.

8.3.1 PORTFOLIO MANAGEMENT PROCESS

Investment is putting aside and employing money in financial instruments in the present, with the expectation of a positive rate of return in the future. Putting it briefly, investment is a sacrifice in the present in the expectation of a future gain.

The questions to be answered first are:

- Ø What is investment?
- Ø What is investment management? and
- Ø Where does the money come from?

Investment is putting aside and employing money in financial instruments in the present, with the expectation of a positive rate of return in the future. Putting it briefly, investment is a sacrifice in the present in the expectation of a future gain.

By extension, Investment management is the art of administering the employment of money in financial instruments in the present, with the expectation of a positive rate of return in the future. These individual financial instruments are kept in a case called the portfolio.

Now where does the money come from? At an individual level, a person does a job of work and earns an income comprising of pay and perks. Here money is the medium of exchange.

The person would sensibly use his income in the following fashion:

1. Provide for current living expenses (or consumption).
2. Provide for personal requirements and deferred expenses.
3. Savings:
   a) To provide for emergency requirements.
   b) Revitalize: Employ for gainful returns in the future (or invest).

To bring focus and concentration upon the subsequent action required to be taken, it would be appropriate to document and have at hand an executive summary. A sample outline of such a documentation is explained below:

To start with the investor may state his background, along with any prior experience he may have with regard to transacting in the stock market amongst the other financial markets and the level of success he may already have achieved. After which he may state his business concept with regard to

how he would address the stock market with a view towards achieving his investment objectives. He would then list his funding and their sources; which would indeed initially be a part of his savings which he may have decided to revitalize. Of course, he may also source additional funds from like minded individuals; where he would be required to state a minimum assured return to them.

After which he may conduct a market analysis. Usually he would be able to do this through a "top down" or a "bottom up" approach. The former (that is, the top down approach) would be to start the analysis from the macro economic aspects of the market and work his way down through the industries and service sector groups and finally list the specific corporate entities and their overlying stocks which are likely to do well during the investment time horizon. While in the latter (that is the bottom up approach) the analysis would start from the stocks and their underlying corporate entities and working their way up through the industries and service sector groups to the larger macro-economic parameters, with the same view towards short listing stocks which are likely to do well during the investment time horizon.

The investor would also be required to do a competitive analysis with regard to the tools and measures he may have at hand or developed along the way; with a view to assess whether he would have any competitive advantage over the investing population. At this stage it would be prudent on the part of the investor to also list hisinvestment philosophy, investment system and investment methodology; while providing for their improvement through better risk control and investment capital management with the passage of time over the investment time horizon.

While providing for a measurement of portfolio performance, the investor may also consider listing and documenting a time line and milestones over the investment time horizon. Further, in case he projects a growth of his investment system and platform into an organization; he would be well placed to list a proposed management and executive team; while also providing for governance, ownership, control issues and its financials; even if these aspects are hypothetical at this initial stage.

The starting point would be an understanding of the investment management process. This process has 5 steps

- Setting the Investment Objective
- Establishing Investment Policy

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- Selecting the Portfolio Strategy
- Selecting the Assets
- Measuring the Evaluating Performance

A) SETTING THE INVESTMENT OBJECTIVE

The first step for the investor is to set the investment objective. Which would vary for individuals, pension and mutual funds, banks, financial institutions, insurance companies, etc?

For instance the objective for a pension or mutual fund or insurance company maybe to have a cash flow specification to satisfy liabilities at different dates in the future. These liabilities would include redemption, dividends or claim settlement payouts.

For a bank it maybe to lock in a minimum interest spread over their cost of funds. For the individual investor the objective maybe to maximize return on investment. A more appropriate word would be 'optimize'. As the individual would achieve optimum return at optimum risk. To maximize return would imply the maximization of risk, which would not be practical or sustainable.

It would be quite in order to present a sample investment objective for further analysis and modification to suit the requirements of individual investors. The objective would revolve around aspects of income generation, growth of the investment capital, stability and implementation.

Sample Investment Objective:

Income:

- In the year 20XX-XX, I need an income of (state the amount here).
- In the year 20XX-XX, I need an income of (state the amount here).

Growth:

- In the year 20XX-XX, I need an investment capital growth of (state the amount here).
- In the year 20XX-XX, I need an investment capital growth of (state the amount here).

Stability:

- Maintain a reduced factor of risk to achieve an optimum level of return.

Implementation:

- Risk control tools to reduce risk exposure at all times.
- Money management tools to ensure better flow of funds between the various asset classes.
- Document all transactions for future analysis, income review and taxation purposes.

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At the time of the documentation and setting of the investment objective, the investor would be called upon to conduct a SWOT analysis to get a better perspective of his present financial condition and the strengths, weaknesses, opportunities and threats he is faced with. Aspects to consider would be as listed below:

Sample SWOT Analysis:

Strengths:

- Whether he is living in own home/house.
- Whether he owns office space (may even be generating rental income).
- Whether the investment knowledge base is available.
- Whether the investment system, management process, and platform are available.
- Whether the investment capital is available.
- Others; list them.

Weaknesses

- Level of risk tolerance; would be a weakness if it is high.
- Level of money management skills.
- Whether there is enough income generation through present investments.
- Whether there is a current expenses overrun.
- Others; list them.

Opportunities:

- Whether there is potential for growth.
- Others; list them.

Threats:

- Inflation risk.
- Interest rate risk.
- Conduct and actions of the peer group and extended family which may cause financial damage or harm.

- Others; list them.

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The next step would be for the investor to document his risk tolerance. A sample would be as stated below:

Sample Risk Tolerance Review

I have been through the stock market crash of 20XX-XX. Amongst the reasons for coming out relatively unscathed is that I did not sell any stock positions. However, during the up-move I sold stock positions at a reduced level of profit and also at break even points. This has resulted in a reduced level of income generation and investment capital growth; causing an erosion of the investment capital on account of current expenses and contingency provisioning.

Having learnt good lessons over the years, I have concluded that it would be prudent to reduce the risk tolerance levels from high to medium. This would require me to follow the investment systems and processes already known and adopt a more disciplined manner of addressing the stock market.

Thereafter, it would be quite in order to state the investment time horizon. It would be prudent to restrict the time horizon to one year at a time; along with a periodic performance review during and at the end of the investment time horizon. This would be for the primary purpose of improving performance over the subsequent years.

Sample Investment Time Horizon

The present investment time horizon is for a period of one year; which is January 20XX to December 20XX. This would see me go through four quarters; which are January – March, April – June, July – September and October – December.

Last but not the least, the investor must state and document the matters that would require his attention in the future. Some such matters are listed below:

Matters for attention in the future

- Build human capital and knowledge base.
- Life and disability insurance.
- Investment in real estate (residential and office space).
- Children education and resource allocation.
- Financial security for the family.
- Savings for retirement.

- Wealth creation.
- Charitable activity.
- Others; list them.

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As a word of caution and a disclaimer of sorts, the investor must appreciate that the above documented sample investment objective, is but a sample. The investor would be required to document his own investment objective; and subsequently analyze and appreciate whether he has been able to achieve such investment objectives. It would be fair to say that the setting of, monitoring; and subsequent analysis and revalidation of the investment objective against real time investment results is a dynamic process.

B) ESTABLISHING INVESTMENT POLICY

Establishing or setting investment policy begins with asset allocation amongst the major asset classes available in the capital market. Which range from equities, debt, fixed income securities, real estate, foreign securities to currencies. This may also be understood as the establishing of investment policy begins with the allocation of the financial resource amongst the major asset classes available in the capital market. Which range from equities, debt, fixed income securities, real estate, foreign securities and currencies, commodities, amongst others.

While establishing the investment policy the constraints of the environment and that of the investor have to be kept in perspective.

The environment would include: government rules and regulations (or restrictions); another would be the operating system of the market place. Individual constraints would include financial capability, availability of time to undertake the exercise, risk profile and the level of understanding the investor has of the investment environment.

From the perspective of the individual investor, it would be more a matter of strategy and tactics while engaging directly with the investment environment through the various markets he may have access to; and would include the stock market amongst other markets both regional and global.

It would be quite in order to present a sample investment policy for further analysis and modification to suit the requirements of individual investors. The investment policy would revolve around aspects of strategy and tactics.

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Sample Investment Policy

Sample Strategy:

1. The cash assets under management would be strategically allocated in ratio 75:25 between stocks and bonds, respectively. The total cash assets being INR 1,00,000/=, it would be an allocation of INR 75,000/= towards stocks and INR 25,000/= towards bonds.
2. The cash assets allocated towards stocks would be called the operational resource; and would be tactically applied (or invested) in a ratio of 85:15 in select stocks traded in the stock market. This would ensure that there would always be a balance of 15% of the operational resource available in the investment account, when fully deployed (or invested). On other occasions the reverse may occur, when 85% of the operational resource would be available in the investment account with a 15% deployment (or investment) in stocks yet to be sold.
3. Investments would only be done in the Top 100 and Midcap 50 stocks.

Sample Tactics

1. Select stocks would be engaged only when it is our measured assessment that their current market price is below its intrinsic value and offer a fair margin of safety. This would require a study of the balance sheet, profit and loss accounts and cash flow statements of the preceding 5 years with a 3 year projection into the future keeping the growth rate as a constant. Specific reference and regard would be given to the sales and PAT growth; and to the EPS, EPS growth and the relevant P/E multiplier.
2. Technical analysis would also be done to confirm that the select stocks at their current market prices are at oversold levels and below while engaging them; and are at overbought levels and above while disengaging from them.\

Sample Engagement of stock positions

1. Select stock positions would be engaged as the stock price continues to move down. The engagement or purchase of stocks would be done in pyramid formation of M, L1, L2 and L3. The downward price differential between M, L1, L2 and L3 would be 2.5% to 3.0%; where M would be the confirmation of the oversold condition of the select stocks.

2. Further, the investment unit would be the monetary value and multiples thereof; which would result in a larger number of shares being purchased at lower price levels. This would be done with the primary purpose of bringing down the holding cost of the stock positions engaged.
3. Stock positions would be engaged and built upon only as the price moves down. No purchases would be made when there is an intermediate upswing in price. In case of an unanticipated price reversal, the stock position would be available for disengagement as is at higher price levels.

Sample Holding of stock positions

The holding period of the stock positions engaged would be 3 to 4 months, to enable the turnover of the operational resource 4 to 3 times in a given financial year. Further, stock positions would be held till such time that the current market prices of stock positions held are at or above their intrinsic value and a technical analysis overbought condition is not visible.

Sample Disengagement of stock positions

1. The disengagement of stock positions held would be initiated when the current market prices are above their intrinsic value; offer no margin of safety; a technical analysis overbought condition is visible and reasonable profits are available.
2. The disengagement or sale of stock positions would be done in reverse pyramid formation; in the sequence L3, L2, L1 and M as the prices move up. The upward price differential between L3, L2, L1 and M would be 2.5% to 3.0%; where L3 would be the confirmation of the overbought condition of the select stocks.
3. Stock positions would be disengaged and reduced only as the price moves up. No sale would be made when there is an intermediate downswing in price. In case of an unanticipated price reversal, the stock position or its remainder would be available for disengagement on the subsequent up move in price.

As a word of caution and a disclaimer of sorts, the investor must appreciate that the above documented sample investment policy, is but a sample. The investor would be required to document his own investment policy; and subsequently analyze and appreciate whether he has been able to conform or abide by his stated investment policy. It would be fair to say that the establish-

ing of, monitoring and subsequent analysis and revalidation of the investment policy against real time investment results is a dynamic process.

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C] SELECTING THE PORTFOLIO STRATEGY

The portfolio strategy selected would have to be in conformity with both the investment objective and investment policy guidelines. Any contradiction here would result in a systems break down and losses.

Portfolio strategies are mainly of two types; which are active portfolio strategies and passive portfolio strategies. Active strategies have a higher expectation about the factors that are expected to influence the performance of the asset classes. While passive strategies involve a minimum expectation input.

The latter would include indexing which would require the investor to replicate the performance of a particular index. Between these two extremes we have a range of other strategies which have elements of both active and passive strategies. In the fixed income segment, structured portfolio strategies have become popular. Here the aim would be to achieve a predetermined performance in relation to a benchmark. These are frequently used to fund liabilities.

The individual investors who wish to adopt an active portfolio strategy would be required to look into matters of market timing, sector rotation, stock selection and conceptualization.

Market timing the purchase of stocks in the stock market would by default reduce the subsequent holding period of the stocks held in the portfolio with the expectation of a reasonable expectation of return at the point of sale, with the advantage of the financial resources again being available to be applied with regard to other stocks which may provide both opportunities of purchase as well as a fair margin of safety at the point of their subsequent purchase. This would also result in the turning over of the investment capital during the financial period in which this strategy is implemented.

Sector rotation would require an understanding of the segregation of the various stocks into appropriate industries and service sector groups. The investor may now consider short listing the top three to five corporate entities from each of the lead industries and service sector groups for a further study to decide whether the stocks short listed are of investment grade. Thereafter, the investor would be required to move the investment capital from one industry and/or service sector group to another depending on the availability of

a fair margin of safety while engaging such stocks and adequate profits while disengaging from them.

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Stock selection would require a short listing of the investment grade stocks for analysis based on fundamental parameters to confirm their present status of being investment worthy. A further study to check and confirm whether the current market price of such stocks is below its intrinsic value and offer a fair margin of safety; this may also require the application of technical tools to reconfirm a probable oversold condition at the time of such analysis.

Conceptualization would require the investor to have at hand an investment philosophy, upon which subsequent investment decisions would be based. This philosophy would be based on an understanding of various forces which effect the stock markets and the movement of the prices of stocks traded in them. Forces would include demand supply mismatches in the stock market itself as well as in other allied markets (like commodities and forex amongst other such markets including global, regional and national) which may influence its performance, stock market psychology (an oscillation between fear and greed), political (including government policies) stability or otherwise of the nation in which the stock market exists, amongst others. In addition, the investor would also be required to segregate the stocks short listed into categories of growth, bell weathers, stars, cyclical, technology based and asset rich. Thereafter, the investor would either choose a value based or growth based approach.

Check your Progress

7. What is Tactical Assets Allocations?
8. Explain Sharpe Measure
9. Explain Treynor's Measure.
10. Explain Jensen's Measure.

In the long run, the individual investor would find that the above selection of the portfolio strategy and its subsequent implementation would be intuitive. It would require the individual investor to ascertain whether he has the time to take on the challenges offered by this shift form a passive portfolio strategy to an active portfolio strategy stance. If it is found that the time required for this exercise is not readily available, then the individual investor may continue to maintain the expected present stance of a passive portfolio strategy.

Of course, a passive portfolio strategy stance would have the advantage of safety of the investment capital although at a lower rate of return or growth; but, then again the individual investor would have a larger investment capital base to start with, when he does get around to adopting an active portfolio strategy stance. The individual investor would also realize that selecting an appropriate portfolio strategy is but one link (or part) of what may be called

the portfolio management framework. That the individual investor chooses to be cautious at all times would hold him in good stead in the long run.

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As a word of caution and a disclaimer of sorts,

the investor must appreciate that the above selection of the portfolio strategy is only indicative of aspects the investor would have to consider while shifting from a passive portfolio strategy to an active portfolio strategy. The investor would be required to document his own investment objective and investment policy; and subsequently clearly state (or select) the appropriate portfolio strategy to be adopted for subsequent investment decision making.

It would be fair to say that selecting the portfolio strategy, monitoring its performance and subsequent revalidation would indeed be a dynamic process. The saving grace of course would be that one part is linked to the other and therefore a change proposed to be implemented in any one part would require an revalidation of the other parts. These parts being; selecting the portfolio strategy, establishing investment policy and setting the investment objective.

D] SELECTING THE ASSETS

It is of importance for the investor to select specific assets to be included in the portfolio. It is here that the investor or manager attempts to construct an optimal or efficient portfolio. Which would give the expected return for a given level of risk, or the lowest risk for a given expected return? The asset classes he can choose from are:

The asset classes he can choose from are:

- Equity
- Fixed Income Securities (Which Would Include RBI Bonds And Bank Deposits)
- Debt Instruments
- Real Estate
- Art Objects
- Rare stamps
- Currencies

We realize that this area of our field of endeavor is a serious matter for any investor of the stock market, so it is best to start with the basics. We expect that, the investor has an understanding of the various aspects of investment management. Now, we would be introducing the aspect of "trading".

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Trading is basically buying and selling a financial instrument, like a stock quoted in the stock market. And making a profit from the transaction. That is the investor's selling price is more than the cost price.

The stock market over a period of time would show the following conditions or phases:

Bull phase. Where the equities traded in the stock market are taking at least 2 steps forward with one step back. This may extend to 6 steps forward to 2 steps back. In further extreme conditions there would be no top to the stock market.

Bear phase. Where the equities traded in the stock market take 2 steps back for every one step forward. This may extend to 6 steps back to 2 steps forward. In further extreme conditions there would be no bottom to the stock market.

Consolidation phase. Where the stocks traded in the stock market have reached an equilibrium level and are taking one step forward for every one step back. However, the various participants of the stock market are awaiting some news to take the price up or down depending on the nature of the news. That is whether the news is as per expectation, better than expectation or not as per expectation and what effect it has on the valuation of the stock in question. Thereafter we can expect a further move in the price levels.

Distribution phase. Where the stocks traded in the stock market have achieved high price levels maybe their yearly highs. It is here that the strong hands (knowledgeable investors) are selling equities to the weak hands (not so knowledgeable investors). After the selling is over and done with, we may safely expect a down move in price levels. That is, prices would move down and back to their fair values or below it. Let's face it, which knowledgeable investor would buy stocks when he knows that there is no margin of safety available in the transaction.

It is to remember, whichever phase the market may exist in, it is taking one step at a time. However, depending on the nature of the stage the market may take more than one step in a day. This would cause happiness to investors if the net outcome is positive and sadness if the net outcome is negative.

One of the most consistently returning asset classes as an investment over the long term; and the one that the majority of us can profit from is real estate. However, good management skills on your part is a prerequisite.

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Having made the bold and glorious decision to sack the boss and go it alone you are one of the few who have what it takes to succeed. You have an entrepreneurial spirit and a strong will and these are rare and valuable attributes that will guide you throughout your professional and personal life. Now that your business is up and running and you're profiting from your efforts, it's time to turn your attentions to investing the profits from your home based business wisely and for maximum gain.

Understanding market cycles. Now, you're most likely aware that property markets are cyclical; this is because there is a direct correlation between the underlying price of real estate in relation to individual buying power.

Simply explained: When property prices rise above what first time buyers can afford to pay the market slows down, stagnates and sometimes readjusts – but as soon as purchasing power increases again, either with a drop in interest rates or an increase in GDP, the property prices begin rising again. And there are even ways to make money from real estate during a market downturn!

Investing in real estate for income: Depending on the nature of your home based business your monthly income may be slightly erratic, some months being better than others! If you invest in property assets in a buy-to-let or even jet-to-let capacity you can secure yourself a consistent monthly income which may afford you an added degree of financial security.

Buy-to-let is when you purchase property for rental purposes, this maybe an apartment you let to a corporate, it could be a house you let to students studying in a nearby university; or even a family home you rent out long term

Jet-to-let is similar but it involves purchasing overseas property for short term weekly or fortnightly rental to tourists. This type of letting is usually very lucrative indeed during peak holiday periods but may mean you have a property that is empty for a few months out of season.

Both types of property investment return you a regular income and at the same time the physical real estate asset will grow in value over the long term; and if ever you wish to release the profits from your investment you can sell on the property and take the gains you have accrued.

Investing in real estate for profit: The alternative to building up a real estate (or property) portfolio for income generation purposes is purchasing property and selling it on relatively quickly to realize the gains the asset has accrued.

You can do this in a number of ways; firstly you can purchase run down property in need of renovation, tidy up the property and turn it into a home before selling it on at a higher price and reaping the profits gained. Alternatively you could seek to beat the curve by buying into up and coming areas, waiting for prices to boom and then selling on for profit. This is quite a risky strategy for a first time investor as timing the market is hard!

An alternative to this is looking overseas for the latest emerging property markets worldwide and buying properties to renovate or properties off plan and then flipping them on for maximum gains in the short term.

Financing your investment: As a self-employed individual it can be tricky to get a mortgage unless you have audited accounts, bank references and other documents required for the purpose. If you don't have all of these requisite documents there are other options available to you.

You may have heard about Forex trading and seen many sites on the internet propagating this seemingly great investment opportunity. In fact, a lot of interest has been generated in this investment instrument. There are some organizations running TV commercials, offering this "Forex trading" as a sure fire system that is expected to bring windfall profits in an easy fashion to the individual investor; along-with the fine print of a disclaimer.

The investor is well advised to ask a few questions. So, what is Forex? And what's new about it?

The exchange of currencies is said to be amongst the world's oldest professions. As long as there are two sovereign states with their respective currencies, there would be a foreign exchange as a facilitator for trade in those currencies. Foreign exchange has been abbreviated to Forex and has been around as a trading platform for centuries; with a present day daily turnover of US$ 1.90 trillion.

Essentially it is a global marketplace with no physical exchange building where all claims on foreign currencies are settled, between governments, corporations, investors and speculators amongst the other participants in the Forex markets.

Banks have traditionally been the middlemen who provide the liquidity to this mammoth market, which is trading round the clock across various locations of the globe.

In more recent times, the internet came along; and all of a sudden it became possible for everyone and anyone to transact and trade in the market.

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What we might say, "get a piece of the speculative action". Next, brokers sprouted up out of nowhere with their electronic trading platforms and offering high leverage to their clients. Basically, the brokers lent funds to their clients to speculate with. A leverage of 100:1 and in some cases 400:1 is offered to the clients. This would mean that with a trading account balance of US$ 10,000.00 the investor (speculator in this case) can control up to US$ 40,00,000.00 in the currency markets. This is much higher than is possible in the stock market.

Many people have been attracted to this possibility of earning fast profits from Forex. Often there are sharp movements that can turn your US$ 10,000.00 into US$ 20,000.00 in a matter of minutes; and on the other hand you could be wiped out, due to adverse market action. However, the lure of making a fast buck has turned would be speculators into out-and-out gamblers.

The internet has also made it possible for an individual investor to obtain "charts", that enable technical analysis on their own PCs. The theory being that price patterns repeat themselves. So, if you have a system of analysis in place; you are expected to be able to predict future price moves in the market. A tall order for any individual investor.

Even if the individual investor were able to successfully predict future price moves, we have not addressed the psychology of trading; which would include the waves of fear and greed that cause irrational market behavior. People are often taken in by the seller of a Forex trading system; often paying US$ 5,000.00 for a software which shows a green light to buy and a red light to sell. In spite of this, they don't teach you how to manage your money.

New investors to Forex trading do not know the rules of engagement and therefore conduct themselves like speculators. Further, a large percentage of these investors lose all their investment capital within the first year. We must realize that, Forex trading is just like any other business and a certain amount of planning would be required. Also being a profession a certain level of training would be essential.

Like other investment instruments, we have to keep the risk and reward in perspective. The investor would realize that there is a high level of risk in Forex trading, and therefore the expected return is also high. So, in the planning process, the investor would have to decide upon his own level of acceptable risk. However, new investors are unable to reconcile this risk-reward equation; and therefore do not have control over either the risk or the reward.

New investors have unrealistic expectations of profits from Forex trading. The investor may overcome this by deciding in advance the parameters of trading and then follow them diligently, to achieve a certain amount of success.

Before venturing into Forex trading, the investor would be well advised to find a teacher or mentor. This mentor is expected to firstly explain the theory behind Forex trading; then guide the investor through sample trades using pen and paper; and finally guide the investor through Forex trading in real time using real money. Further, the investor would be able to draw upon the mentor's experiences and avoid the common errors he may have otherwise committed.

Forex trading in itself is safe if the investors were to be realistic in their expectations and have done their initial preparation. The investors would realize that it is hard work and can provide a profession or a source of income to them. However, the investors must be on their guard against scamsters like in any other business.

The investor would ideally have all the above in his investment portfolio. This would then require the investor to rebalance the various components of his overall portfolio from time to time, depending on his objectives with respect to this portfolio. These objectives may be time based or asset price based or a combination of both.

E] MEASURING AND EVALUATING PERFORMANCE

This step would involve the measuring and evaluating of portfolio performance relative to a realistic benchmark.

We would measure portfolio performance in both absolute and relative terms, against a predetermined, realistic and achievable benchmark. Further, we would evaluate the portfolio performance relative to the objective and other predetermined performance parameters.

The investor or manager would consider two main aspects; namely risk and return. He would measure and evaluate, whether the returns were worth the risk, or whether the risk was worth the return. The issue here is, whether the portfolio has achieved commensurate returns, given the risk exposure of the portfolio.

Measuring and evaluating portfolio performance, would be used to give the investor or manager feedback. And would help the investor or manager in improving the quality and performance of both the portfolio and its manage-

ment process in the future. The detailed performance of portfolio is discussed in next chapter.

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8.3.2 ASSET ALLOCATIN PLAN

ASSET ALLOCATION

Asset allocation is a plan to invest in different types of securities (stocks, bonds, and money market funds) so that the capital invested is protected against adverse factors in the market. This, in essence, is the opposite of an investor putting all his or her eggs in one basket. Diversification is the other balancing tool in a portfolio.

For example, a portfolio might have investments in different asset classes according to a well-balanced asset allocation plan, but all the stocks and bonds might be invested in companies in the same economic sector, which would not insulate the portfolio from the risk of loss.

By investing in the stocks of different companies in various sectors of the economy and different types of bonds, the portfolio would be better insulated against the risk of loss. The risk of loss has been spread over a number of securities. Increasing the number of stocks and bonds held in a portfolio decreases the volatility.

However, by increasing the number of stocks and bonds held in a portfolio, investors are also reducing the potential performance of that portfolio. Diversification seeks a balance between the risk/return tradeoff. The return on a portfolio depends on the types of investments held in the portfolio.

Classifying some of the different types of investments on a continuum of risk, common stocks are considered to be the most risky (in terms of variability in share price), followed by long-term bonds, with the shorter maturities on the low-risk end.

Bear in mind that there are many other types of investments that are riskier than common stocks, such as commodities and futures contracts. Similarly, there is a great variation in quality among common stocks. The common stocks of the well-established blue-chip companies are considered to be less risky than the bonds of highly leveraged companies with suspect balance sheets.

Common stocks are considered to be the most risky owing to the volatility of stock prices. However, over long periods of time where the ups and downs of the stock market can be averaged out, stocks have provided higher returns. Common stocks provide the growth in a portfolio and should be included among the investment assets to accomplish long-term growth goals.

The percentage allocated to common stocks depends on the investor's objectives and personal characteristics.

As mentioned earlier, a retired widow who depends on the income generated from the investments in the portfolio may not have any common stocks in the portfolio. However, if the portfolio generates more than a sufficient level of income for the widow's current needs, a small portion of the portfolio could be invested in common stocks to provide some growth in the portfolio for later years.

There isn't a rigid formula for asset allocation. Rather, it is a good idea to think about the concept as a guideline when investing money. Some investors may tilt toward an aggressive portfolio, whereas others require a conservative portfolio. The mix of investment assets depends primarily on the levels of risk that investors are willing to take and their time horizons. The percentage allocated to the different types of assets always can be changed depending on circumstances. As individual circumstances change, so will the investor's objectives.

If the emphasis shifts, for example, to greater income generation and preservation of capital from capital growth, the percentage of the investments in the portfolio can be changed accordingly. The most important aspect of investing is having an asset allocation plan that signifies the broad mix of assets to strive for. Once these broad categories are determined, the individual assets are purchased. When considering the different types of securities to choose for a portfolio, investors should weigh the characteristics of the types of investments along with the risks to assist them in their overall choice.

The Need For Rebalancing A Portfolio

If the investor's objectives and personal characteristics have not changed one year later, the asset allocation mix should be realigned to the original mix. Both advantages and disadvantages arise from rebalancing a portfolio.

The advantages are

* The relative weighting of the portfolio assets are aligned with the individual's objectives, personal characteristics, risk tolerance, and rate of return.
* The risk of loss is reduced by selling appreciated assets to realize capital gains.

The disadvantages of rebalancing a portfolio are

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* Rebalancing a portfolio incurs trading costs (commissions) and advisory fees.
* Investors run the potential risk of loss that comes from selling the winners in the portfolio to buy more of the losing assets.
* Selling securities involves tax implications in taxable accounts.

Rebalancing a Portfolio

1. Begin with an asset allocation plan

   The investor started with the asset allocation

2. Revisit the asset allocation plan after a period of time.

One year later with the rapid appreciation of the equity portfolio, the asset allocation mix has changed to the percentages.

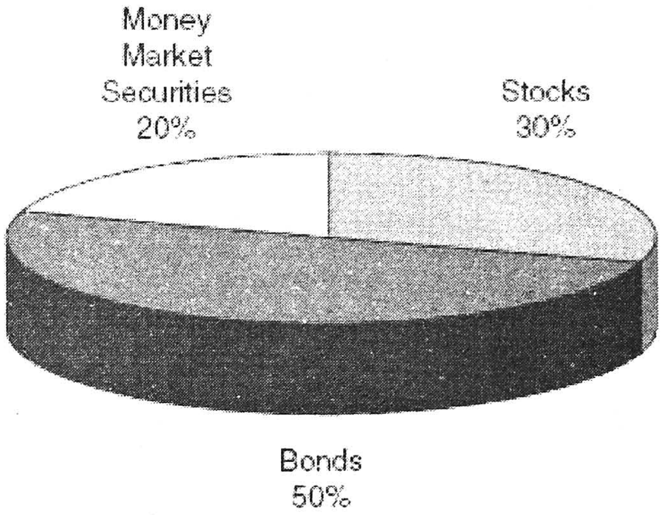
3. If necessary, rebalance the portfolio. The investor needs to determine whether this new asset allocation mix is consistent with his or her objectives, personal circumstances, and risk tolerance. With appreciation of the equity assets, the new equity mix is now 50 percent to 35 percent. This may not be suitable for an investor who relies more on incomegenerating assets than on growth assets. Rebalancing requires selling off some stocks and buying more bonds with the proceeds in order to realign the asset allocation mix closer to an acceptable asset allocation mix.

4. Proposed asset allocation plan after rebalancing.

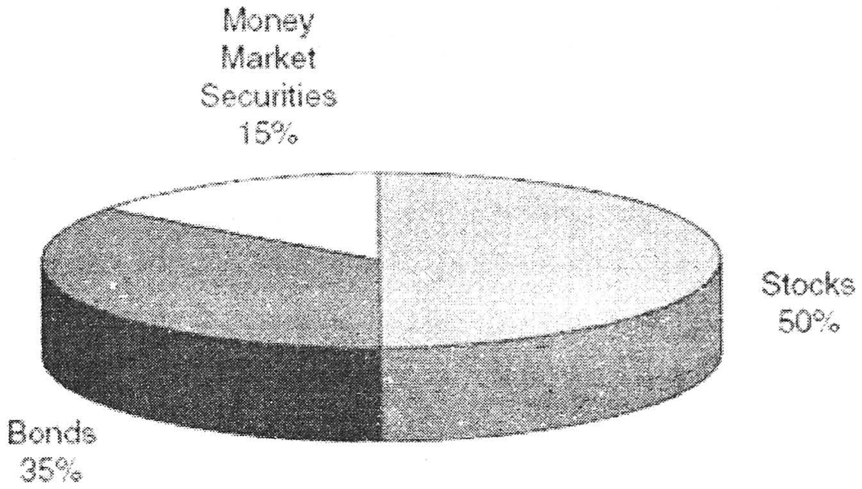
The Following Figures shows the current and proposed asset allocation mixes.

Current Asset Allocation Mix		Proposed Asset Allocation Mix	
Money market securities	15%	Money market securities	15%
Money market mutual funds	$45,000	Money market mutual funds	$45,000
Stocks	50%	Stocks	35%
Large-cap stocks	$150,000	Large-cap stocks	$52,500
Bonds	35%	Mid-cap stocks	$52,500
		Bonds	50%
Intermediate municipal bonds	$50,000	Long-term treasury bonds	$75,000
Intermediate-term agency bonds	$55,000	AAA corporate bonds	$75,000
Total	$300,000	Total	$300,000
Before-tax return	5.10%	Before-tax return	6.15%
After-tax return	3.15%	After-tax return	4.5%
Risk (standard deviation)	9.00%	Risk (standard deviation)	7.65%

Original Asset Allocation Mix



Asset Allocation Mix one year later



Current and Proposed Asset Allocation Mixes

The most important aspect of investing is having an asset allocation plan that signifies the broad mix of assets to strive for. Once these broad categories are determined, the individual assets are purchased. Table 18–2 presents examples of different asset allocation plans for investors with different investment objectives.

Asset Allocation Models for Different Investment Objectives

A conservative portfolio is one in which the investment goals are to preserve capital, allowing for some growth to the portfolio. The weighting is geared toward high-quality bonds and some common stocks for growth.

See Figure

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See Figure

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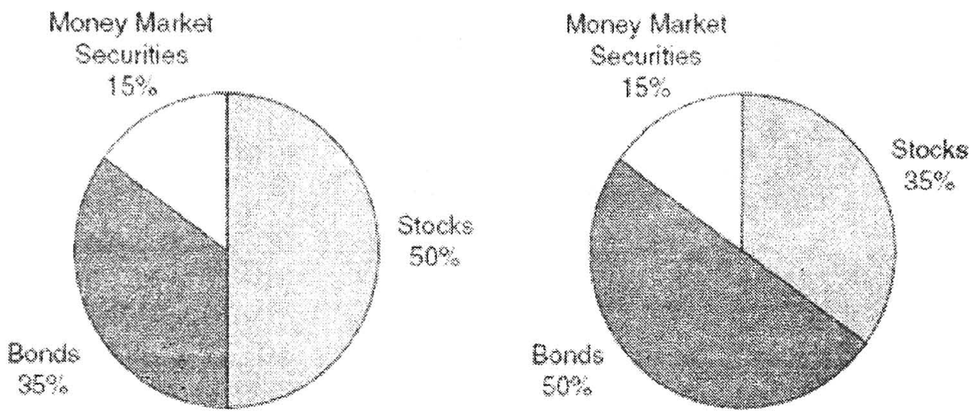
A balanced portfolio includes a larger percentage allocated to common stocks, which provide capital growth for the portfolio, and another large percentage of fixed-income securities, which provide the income for the portfolio. See Figure.



An aggressive portfolio is overweighted in common stocks in order to provide capital growth without any regard for generating income for the portfolio. See Figure 18–6.

The allocation plan of a young couple, both professionals who are not dependent on income from their investments and are investing for long-term growth, could break down their stock investments into the categories shown in Figure 18–7. This is a second example of an aggressive portfolio allocation.

Figure. Asset Allocation for a Conservative Investor

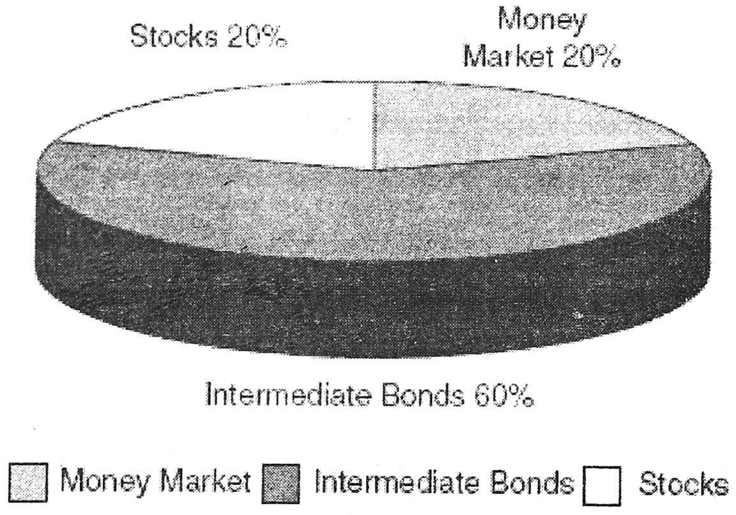


Figure. Asset Allocation for a Balanced Portfolio

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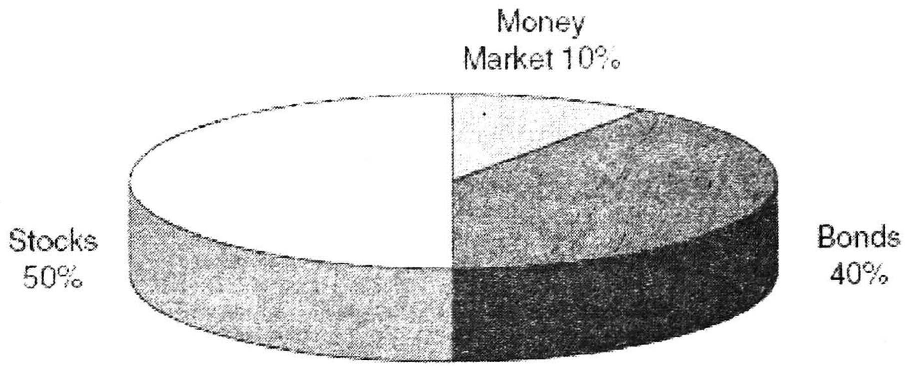


Figure 18-6. Asset Allocation for an Aggressive Portfolio

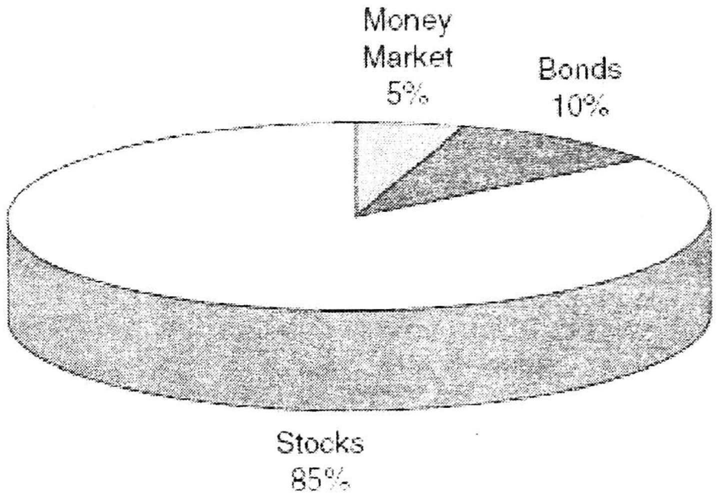
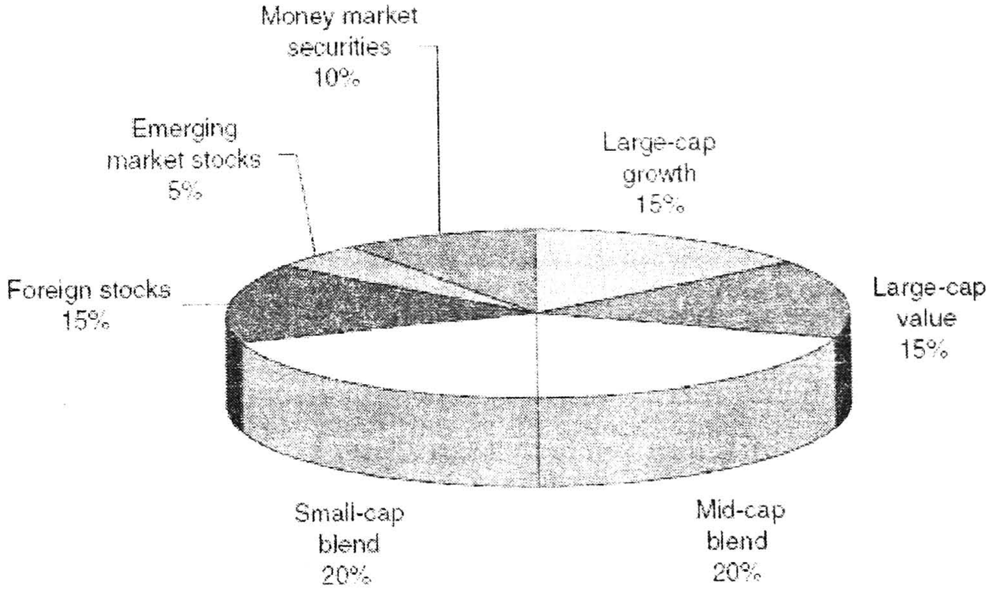


Figure 18-7. Stock Portfolio Allocation for a Couple Seeking Long-Term Growth



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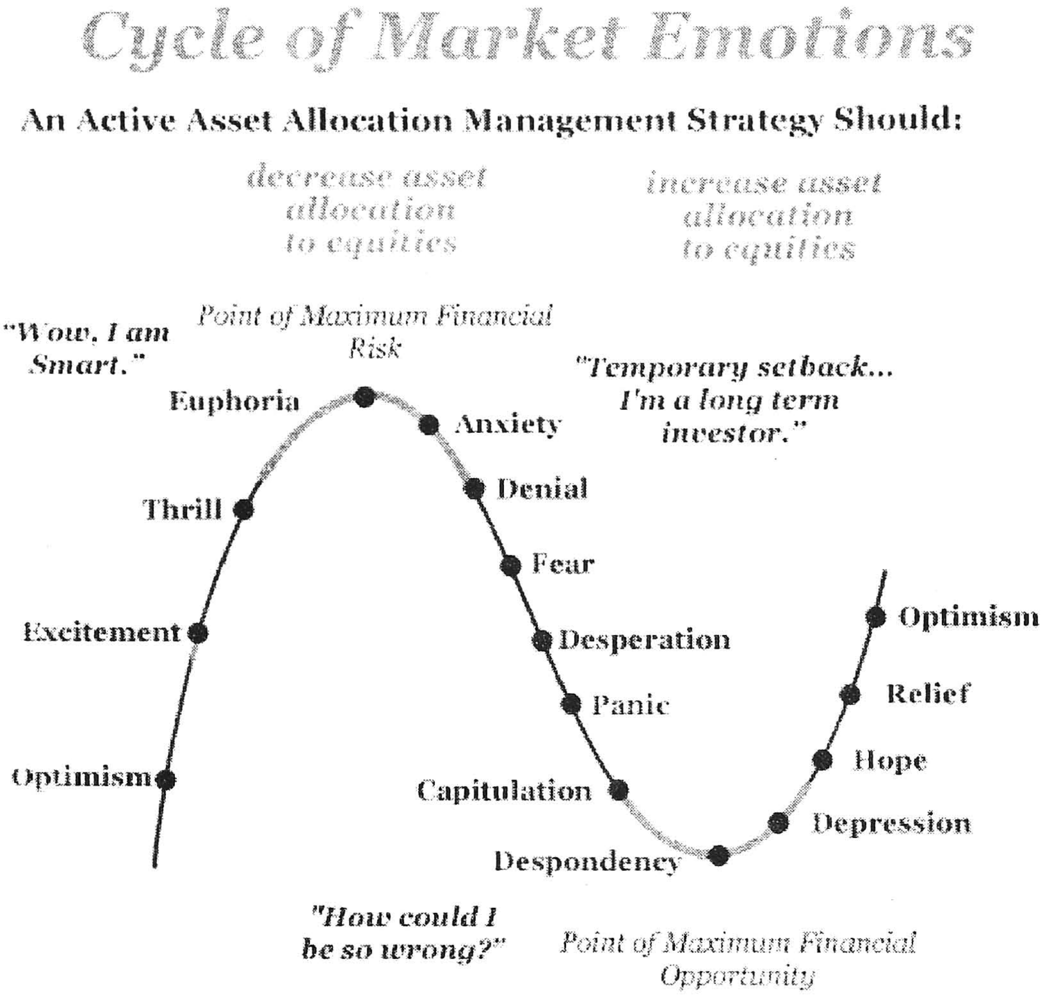

Six Asset Allocation Strategies That Work

Establishing an appropriate asset mix is a dynamic process and it plays a key role in determining your portfolio's overall risk and return. As such, your portfolio's asset mix should reflect your goals at any point in time. There are a few different strategies of establishing asset allocations, and here we outline some of them and examine their basic management approaches.

Strategic Asset Allocation

Strategic asset allocation is a method that establishes and adheres to what is a "base policy mix." This is a proportional combination of assets based on expected rates of return for each asset class. For example, if stocks have historically returned 10% per year and bonds have returned 5% per year, a mix of 50% stocks and 50% bonds would be expected to return 7.5% per year.

Constant-Weighting Asset Allocation

Strategic asset allocation generally implies a buy-and-hold strategy, even as the shift in the values of assets cause a drift from the initially established policy mix. For this reason, you may choose to adopt a constant-weighting approach to asset allocation. With this approach, you continually rebalance your portfolio. For example, if one asset were declining in value, you would purchase more of that asset, and if that asset value should increase, you would sell it.

There are no hard-and-fast rules for the timing of portfolio rebalancing under strategic or constant-weighting asset allocation. However, a common rule of thumb is that the portfolio should be rebalanced to its original mix when any given asset class moves more than 5% from its original value.

Tactical Asset Allocation

Over the long run, a strategic asset allocation strategy may seem relatively rigid. Therefore, you may find it necessary to occasionally engage in short-term, tactical deviations from the mix in order to capitalize on unusual or exceptional investment opportunities. This flexibility adds a component of market timing to the portfolio, allowing you to participate in economic conditions that are more favorable for one asset class than for others.

Tactical asset allocation can be described as a moderately active strategy, since the overall strategic asset mix is returned to when desired short-term profits are achieved. This strategy demands some discipline, as you must first be able to recognize when short-term opportunities have run their course, and then rebalance the portfolio to the long-term asset position.

Dynamic Asset Allocation

Another active asset allocation strategy is dynamic asset allocation, with which you constantly adjust the mix of assets as markets rise and fall and the economy strengthens and weakens. With this strategy you sell assets that are declining and purchase assets that are increasing, making dynamic asset allocation the polar opposite of a constant-weighting strategy. For example, if the stock market is showing weakness, you sell stocks in anticipation of further decreases, and if the market is strong, you purchase stocks in anticipation of continued market gains.

Insured Asset Allocation

With an insured asset allocation strategy, you establish a base portfolio value under which the portfolio should not be allowed to drop. As long as the

portfolio achieves a return above its base, you exercise active management to try to increase the portfolio value as much as possible. If, however, the portfolio should ever drop to the base value, you invest in risk-free assets so that the base value becomes fixed. At such time, you would consult with your advisor on re-allocating assets, perhaps even changing your investment strategy entirely.

You can implement an insured asset allocation strategy with a formula approach or a portfolio insurance approach. The formula approach is a graduated strategy: as the portfolio value decreases, you purchase more and more risk-free assets so that when the portfolio reaches its base level, you are entirely invested in risk-free assets. With the portfolio insurance approach you would use put options and/or futures contracts to preserve the base capital. Both approaches are considered active management strategies, but when the base amount is reached, you are adopting a passive approach.

Insured asset allocation may be suitable for risk-averse investors who desire a certain level of active portfolio management but appreciate the security of establishing a guaranteed floor below which the portfolio is not allowed to decline. For example, an investor who wishes to establish a minimum standard of living during retirement might find an insured asset allocation strategy ideally suited to his or her management goals.

Integrated Asset Allocation

With integrated asset allocation you consider both your economic expectations and your risk in establishing an asset mix. While all of the above-mentioned strategies take into account expectations for future market returns, not all of the strategies account for investment risk tolerance. Integrated asset allocation, on the other hand, includes aspects of all strategies, accounting not only for expectations but also actual changes in capital markets and your risk tolerance. Integrated asset allocation is a broader asset allocation strategy, albeit allowing only either dynamic or constant-weighting allocation. Obviously, an investor would not wish to implement two strategies that are competing with one another.

Conclusion

Asset allocation can be an active process to varying degrees or strictly passive in nature. Whether an investor chooses a precise asset allocation strategy or a combination of different strategies depends on that investor's goals, age, market expectations and risk tolerance.

Keep in mind, however, that this article gives only general guidelines on how investors may use asset allocation as a part of their core strategies. Be aware that allocation approaches that involve anticipating and reacting to market movements require a great deal of expertise and talent in using particular tools for timing these movements. Some would say that accurately timing the market is next to impossible, so make sure your strategy isn't too vulnerable to unforeseeable errors.

8.4 PORTFOLIO EXECUTION

Portfolio construction refers to the allocation of funds among a variety of financial assets open for investment. Portfolio theory concerns itself with the principles governing such allocation. The objective of the theory is to elaborate the principles in which the risk can be minimized subject to desired level of return on the portfolio or maximize the return, subject to the constraint of a tolerate level of risk.

Thus, the basic objective of portfolio management is to maximize yield and minimize risk. The other ancillary objectives are as per the needs of investors, namely:

- Safety of the investment
- Stable current Returns
- Appreciation in the value of capital
- Marketability and Liquidity
- Minimizing of tax liability.

In pursuit of these objectives, the portfolio manager has to set out all the various alternative investment along with their projected return and risk and choose investment with safety the requirement of the individual investor and cater to his preferences. The manager has to keep a list of such investment avenues along with return-risk profile, tax implications, yield and other return such as convertible options, bonus, rights etc. A ready reckoned giving out the analysis of the risk involved in each investment and the corresponding return should be kept.

The portfolio construction, as referred to earlier, be made on the basis of the investment strategy, set out for each investor. Through choice of asset classis, instrument of investment and the specific scripts, save of bond or equity of different risk and return characteristics, the choice of tax characteristics, risk level and other feature of investment, are decided upon.

8.4.1 EXECUTION

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All portfolios, whether they are stock or bond portfolios, are compared to benchmarks to gauge their performance; indices or peer group statistics are used to monitor the success of each fund.

As composites, the indices can be thought of as similar to polls: a polling firm that seeks to understand what a certain population thinks about a certain issue will ask representatives of that cross-section of the population. Similarly, a stock or bond benchmark that seeks to measure a certain portion of the market will simply compile the values of representative stocks or bonds.

Portfolio construction refers to the manner in which securities are selected and then weighted in the overall mix of the portfolio with respect to these indices. Portfolio construction is a fairly recent phenomenon, and has been driven by the advent of modern portfolio theory.

1. Passive investors or index funds

Portfolios that are constructed to mimic the composition of various benchmarks are referred to as index funds. Investors in index funds are classified as passive investors, and investment managers who manage index funds are often called "indexers." These funds are continually tinkered with to ensure that they match the performance of the index. For equities, the S&P 500 is the benchmark that is most commonly indexed.

2. Active investors

Portfolios that are constructed by consciously selecting securities without reference to the index are referred to as active portfolios. Active portfolios adhere to their own investment discipline, and investment managers actually invest in what they think are the best stocks or bonds. They are then compared, for performance purposes only, to the pre-selected index that best represents their style. For instance, many large-capitalization active value portfolios are compared to either the S&P 500 Value index.(It is important to note that while active portfolios are still compared to indices, they are not designed specifically to mimic the indices.)

3. Alternative methods

Variations of active and passive portfolios are present throughout the marketplace. There are enhanced index funds that closely examine the benchmark before making an investment. These portfolios mimic the overall characteristics of the benchmark and make small bets that differentiate the portfolio from its index. Another type of popular portfolio construction method is sec-

tor investing. This is essentially a portfolio that is comprised of companies that operate in the same industry. Common sector portfolios include technology, health care, biotechnology and financial services.

8.4.2 SECURITY ANALYSIS PHASE IN INVESTEMENT PORTFOLIO MANAGEMENT

The different types of securities are available to an investor for investment. In stock exchange of the country the shares of 12000 companies are listed. Traditionally, the securities were classified into ownership such as equity shares, preference share, and debt as a debenture bonds etc.

Recently companies to raise funds for their projects are issuing a number of new securities with innovative feature. Convertible debenture, discount bonds, Zero coupon bonds, Flexi bond, floating rate bond, etc. are some of these new securities. From these huge group of securities the investors has to choose those securities, which he considers worthwhile to be included in his investment portfolio. So for this detailed security analysis is most important.

The aim of the security analysis is to find out intrinsic value of a security. The basic value is also called as the real value of a security is the true economic worth of a financial asset. The real value of the security indicates whether the present market price is over priced or under priced in order to make a right investment decision. The actual price of the security is considered to be a function of a set of anticipated capitalization rate. Price changes, as anticipation risk and return change, which in turn change as a result of latest information.

Security analysis refers to analyzing the securities from the point of view of the scrip prices, return and risks. The analysis will help in understanding the behaviour of security prices in the market for investment decision making.

The basic value of the security is to be compared with the current market price and a decision may be taken for buying or selling the security. If the basic value is lower than the market price, then the security is in the over bought position, hence it is to be sold. On the other hand, if the basic value is higher than the market price the security's worth is not fully recognized by the market and it is in under bought position, hence it is to be purchased to gain profit in the future.

There are mainly three alternative approaches to security analysis, namely fundamental analysis, technical analysis and efficient market theory.

The *fundamental analysis* allows for selection of securities of different

sectors of the economy that appear to offer profitable opportunities. The security analysis will help to establish what type of investment should be undertaken among various alternatives i.e. real estate, bonds, debentures, equity shares, fixed deposit, gold, jewellery etc. Neither all industries grow at same rate nor do all companies. The growth rates of a company depend basically on its ability to satisfy human desires through production of goods or performance is important to analyze nation economy. It is very important to predict the course of national economy because economic activity substantially affects corporate profits, investors' attitudes, expectations and ultimately security price.

According to this approach, the share price of a company is determined by these fundamental factors. The fundamental works out the compares this intrinsic value of a security based on its fundamental; them compares this intrinsic value, the share is said to be overpriced and vice versa. The mispricing security provides an opportunity to the investor to those securities, which are under priced and sell those securities, which are overpriced. It is believed that the market will correct notable cases of mispricing in future. The prices of undervalued shares will increase and those of overvalued will decline. Fundamental analysis helps to identify fundamentally strong companies whose shares are worthy to be included in the investor's portfolio.

The second alternative of security analysis is technical analysis. The technical analysis is the study of market action for the purpose of forecasting future price trends. The term market action includes the three principal sources of information available to the technician – *price, value, and interest.* Technical Analysis can be frequently used to supplement the fundamental analysis. It discards the fundamental approach to intrinsic value. Changes in price movements represent shifts in supply and demand position. Technical Analysis is useful in timing a buy or sells order. The technical analysis does not claim 100% of success in predictions. It helps to improve the knowledge of the probability of price behaviour and provides for investment. The current market price is compared with the future predicted price to determine the extent of mispricing. Technical analysis is an approach, which concentrates on price movements and ignores the fundamentals of the shares.

A more recent approach to security analysis is the efficient market hypothesis/theory. According to this school of thought, the financial market is efficient in pricing securities. The efficient market hypothesis holds that market prices instantaneously and fully reflect all relevant available information. It means that the market prices of securities will always equal its intrinsic value. As a

result, fundamental analysis, which tries to identify undervalued or overvalued securities, is said to be a useless exercise.

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Efficient market hypothesis is direct repudiation of both fundamental analysis and technical analysis. An investor can't consistently earn abnormal return by undertaking fundamental analysis or technical analysis. According to efficient market hypothesis it is possible for an investor to earn normal return by randomly choosing securities of a given risk level.

8.4.3A PPROACHES OF INVESTMENT PORTFOLIO MANAGEMENT

Different investors follow different approaches when they deal with investments. Four basic approaches are illustrated below, but there could be numerous variations.

i) The Holy-Cow Approach:

These investors typically buy but never sell. He treats his scrips like holy cows, which are never to be sold for slaughter. If you can consistently find and then confine yourself to buying only prized bulls, this holy cow approaches may pay well in the long run.

ii) The Pig-Farmer Approach:

The pig-farmer on the other hand, knows that pigs are meant for slaughter. Similarly, an investor adopting this approach buys and sells shares as fast as pigs are growth and slaughtered. Pigs become pork and equity hard cash.

iii) The Rice-Miller Approach:

The rice miller buys paddy feverishly in the market during the season, then mills, hoards and sells the rice slowly over an extended period depending on price movements. His success lies in his shills in buying and selling, and his financial capacity to hold stocks. Similarly, an investor following this approach grabs the share at the right price, takes a position, holds on to it, and liquidates slowly.

iv) The Woolen-Trader Approach:

The woolen-trader buys woolen ever a period of time but sells them quickly during the season. Hid success also lies in his skill in buying and selling, and his ability to hold stocks. An investor following this strategy over a period of time but sells quickly, and quits.

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8.4.4 RISK-RETURN RELATIONSHIP IN INVESTMENTS

The entire scenario of security analysis is built on two concepts of security: Return and risk. The risk and return constitute the framework for taking investment decision. Return from equity comprises dividend and capital appreciation. To earn return on investment, that is, to earn dividend and to get capital appreciation, investment has to be made for some period which in turn implies passage of time. Dealing with the return to be achieved requires estimated of the return on investment over the time period. Risk denotes deviation of actual return from the estimated return. This deviation of actual return from expected return may be on either side – both above and below the expected return. However, investors are more concerned with the downside risk.

The risk in holding security deviation of return deviation of dividend and capital appreciation from the expected return may arise due to internal and external forces. That part of the risk which is internal that in unique and related to the firm and industry is called 'unsystematic risk'. That part of the risk which is external and which affects all securities and is broad in its effect is called 'systematic risk'.

The fact that investors do not hold a single security which they consider most profitable is enough to say that they are not only interested in the maximization of return, but also minimization of risks. The unsystematic risk is eliminated through holding more diversified securities. Systematic risk is also known as non-diversifiable risk as this can not be eliminated through more securities and is also called 'market risk'. Therefore, diversification leads to risk reduction but only to the minimum level of market risk.

The investors increase their required return as perceived uncertainty increases. The rate of return differs substantially among alternative investments, and because the required return on specific investments change over time, the factors that influence the required rate of return must be considered.

NOTES

Chart-A: RELATIONSHIP BETWEEN RISK AND RETURN

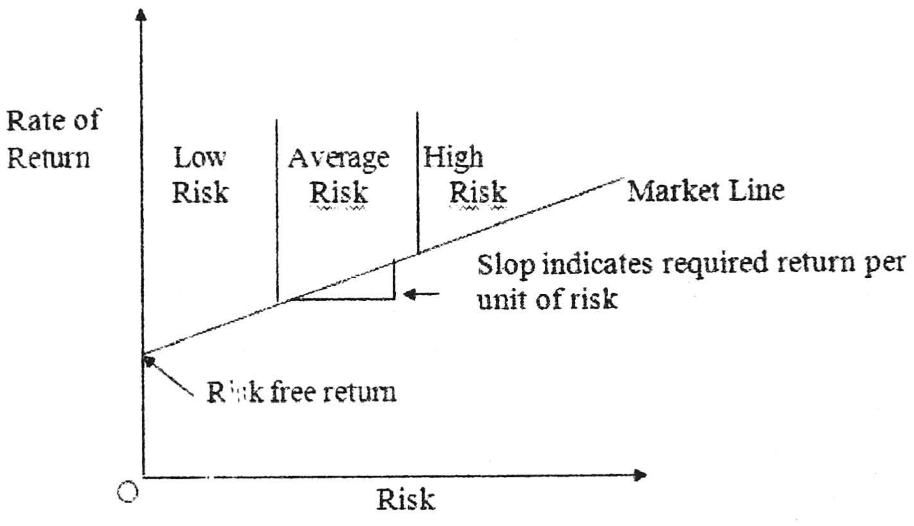
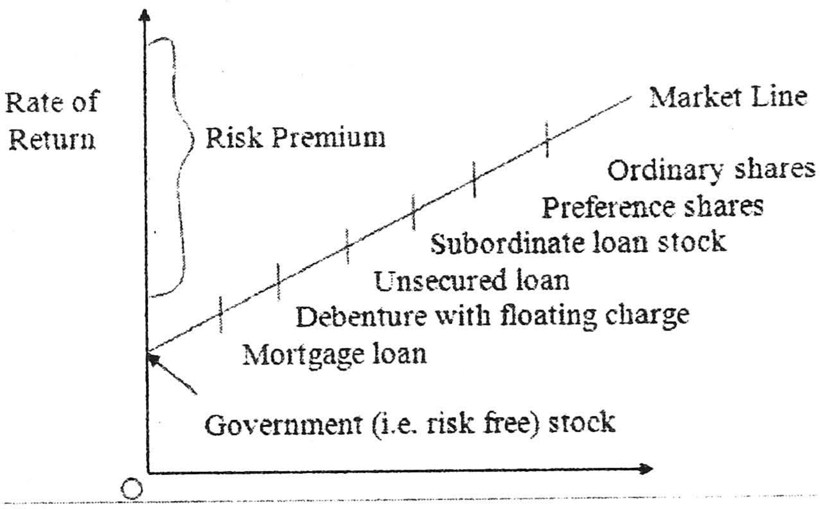


Chart-B: RISK RETURN RELATIONSHIP: DIFFERENT STOCKS



Above chart-A represent the relationship between risk and return. The slop of the market line indicates the return per unit of risk required by all investors highly risk-averse investors would have a steeper line, and Yields on apparently similar may differ. Difference in price, and therefore yield, reflect the market's assessment of the issuing company's standing and of the risk elements in the particular stocks. A high yield in relation to the market in general shows an above average risk element. This is shown in the Char-B

8.4.5 PORTFOLIO INVESTMENT PROCESS

The ultimate aim of the portfolio manager is to reduce the risk and increase the return to the investor in order to reach the investment objectives of an investor. The manager must be aware of the investment process. The process of portfolio management involves many logical steps like portfolio planning, portfolio implementation and monitoring. The portfolio investment process applies to different situation. Portfolio is owned by different individu-

als and organizations with different requirements. Investors should buy when prices are very low and sell when prices rise to levels higher that their normal fluctuation.

Portfolio investment process is an important step to meet the needs and convenience of investors. The portfolio investment process involves the following steps:

1. Planning of portfolio
2. Implementation of portfolio plan.
3. Monitoring the performance of portfolio.

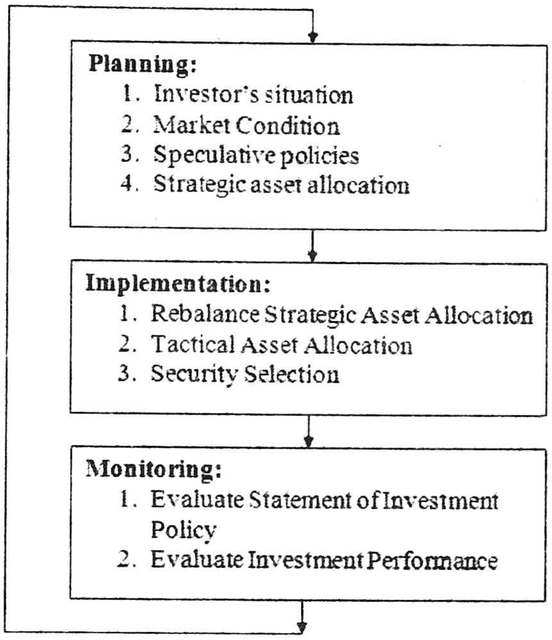
1) Planning of portfolio:

Planning is the most important element in a proper portfolio management. The success of the portfolio management will depend upon the careful planning. While making the plan, due consideration will be given to the investor's financial capability and current capital market situation. After taking into consideration a set of investment and speculative policies will be prepared in the written form. It is called as statement of investment policy. The document must contain (1) The portfolio objective (2) Applicable strategies (3) Investment and speculative constraints. The planning document must clearly define the asset allocation. It means an optimal combination of various assets in an efficient market. The portfolio manager must keep in mind about the difference between basic pure investment portfolio and actual portfolio returns. The statement of investment policy may contain these elements. The portfolio planning comprises the following situation for its better performance:

(A) Investor Conditions: - The first question which must be answered is this – "What is the purpose of the security portfolio?" While this question might seem obvious, it is too often overlooked, giving way instead to the excitement of selecting the securities which are to be held. Understanding the purpose for trading in financial securities will help to: (1) define the expected portfolio liquidation, (2) aid in determining an acceptable level or risk, and (3) indicate whether future consumption (liability needs) are to be paid in nominal or real money, etc.

NOTES

The Portfolio Investment Process



For example: a 60 year old woman with small to moderate saving probably (1) has a short investment horizon, (2) can accept little investment risk, and (3) needs protection against short term inflation. In contrast, a young couple investing couple investing for retirement in 30 years has (1) a very long investment horizon, (2) an ability to accept moderate to large investment risk because they can diversify over time, and (3) a need for protection against long-term inflation.

This suggests that the 60 year old woman should invest solely in low-default risk money market securities. The young couple could invest in many other asset classes for diversification and accept greater investment risks. In short, knowing the eventual purpose of the portfolio investment makes it possible to begin sketching out appropriate investment / speculative policies.

(B) Market Condition: - The portfolio owner must known the latest developments in the market. He may be in a position to assess the potential of future return on various capital market instruments. The investors' expectation may be two types, long term expectations and short term expectations. The most important investment decision in portfolio construction is asset allocation. Asset allocation means the investment in different financial instruments at a percentage in portfolio. Some investment strategies are static. The portfolio requires changes according to investor's needs and knowledge. A continues changes in portfolio leads to higher operating cost. Generally the potential volatility of equity and debt market is 2 to 3 years. The another type of rebalancing strategy focuses on the level of prices of a given financial asset.

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(C) Speculative Policies: - The portfolio owner may accept the speculative strategies in order to reach his goals of earning to maximum extant. If no speculative strategies are used the management of the portfolio is relatively easy. Speculative strategies may be categorized as asset allocation timing decision or security selection decision. Small investors can do by purchasing mutual funds which are indexed to a stock. Organization with large capital can employ investment management firms to make their speculative trading decisions.

(D) Strategic Asset Allocation: - The most important investment decision which the owner of a portfolio must make is the portfolio's asset allocation. Asset allocation refers to the percentage invested in various security classes. Security classes are simply the type of securities: (1) Money Market Investment, (2) Fixed Income obligations; (3) Equity Shares, (4) Real Estate Investment, (5) International securities.

Strategic asset allocation represents the asset allocation which would be optimal for the investor if all security prices trade at their long-term equilibrium values that is, if the markets are efficiency priced.

2) Implementation of portfolio plan

In the implementation stage, three decisions to be made, if the percentage holdings of various assets classes are currently different from the desired holdings as in the SIP, the portfolio should be rebalances to the desired SAA (Strategic Asset Allocation). If the statement of investment policy requires a pure investment strategy, this is the only thing, which is done in the implementation stage. However, many portfolio owners engage in speculative transaction in the belief that such transactions will generate excess risk-adjusted returns. Such speculative transactions are usually classified as "timing" or "selection" decisions. Timing decisions over or under weight various assets classes, industries, or economic sectors from the strategic asset allocation. Such timing decision deal with securities within a given asset class, industry group, or economic sector and attempt to determine which securities should be over or under-weighted.

(A) Tactical Asset Allocation: - If one believes that the price levels of certain asset classes, industry, or economic sectors are temporarily too high or too low, actual portfolio holdings should depart from the asset mix called for in the strategic asset allocation. Such timing decision is preferred to as tactical asset allocation. As noted, TAA decisions could be made across aggregate

asset classes, industry classifications (steel, food), or various broad economic sectors (basic manufacturing, interest-sensitive, consumer durables).

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Traditionally, most tactical assets allocation has involved timing across aggregate asset classes. For example, if equity prices are believes to be too high, one would reduce the portfolio's equity allocation and increase allocation to, say, risk-free securities. If one is indeed successful at tactical asset allocation, the abnormal returns, which would be earned, are certainly entering.

(B) Security Selection: - The second type of active speculation involves the selection of securities within a given assets class, industry, or economic sector. The strategic asset allocation policy would call for broad diversification through an indexed holding of virtually all securities in the asset in the class. For example, if the total market value of HPS Corporation share currently represents 1% of all issued equity capital, than 1% of the investor's portfolio allocated to equity would be held in HPS corporation shares. The only reason to overweight or underweight particular securities in the strategic asset allocation would be to off set risks the investors' faces in other assets and liabilities outside the marketable security portfolio. Security selection, however, actively overweight and underweight holding of particular securities in the belief that they are temporarily mispriced.

(3) Monitoring the performance of portfolio

Portfolio monitoring is a continuous and on going assessment of present portfolio and the portfolio manger shall incorporate the latest development which occurred in capital market. The portfolio manager should take into consideration of investor's preferences, capital market condition and expectations. Monitoring the portfolio is up-grading activity in asset composition to take the advantage of economic, industry and market conditions. The market conditions are depending upon the Government policy. Any change in Government policy would reflect the stock market, which in turn affects the portfolio. The continues revision of a portfolio depends upon the following factors:

1. Change in Government policy.
2. Shifting from one industry to other
3. Shifting from one company scrip to another company scrip.
4. Shifting from one financial instrument to another.
5. The half yearly / yearly results of the corporate sector

Risk reduction is an important factor in portfolio. It will be achieved by a diversification of the portfolio, changes in market prices may have necessitated in asset composition. The composition has to be changed to maximize the returns to reach the goals of investor.

8.5 PORTFOLIO EVALUATION

8.5.1 RATE OF RETURN

In finance, rate of return (ROR), also known as return on investment (ROI), rate of profit or sometimes just return, is the ratio of money gained or lost (whether realized or unrealized) on an investment relative to the amount of money invested. The amount of money gained or lost may be referred to as interest, profit/loss, gain/loss, or net income/loss. The money invested may be referred to as the asset, capital, principal, or the cost basis of the investment. ROI is usually expressed as a percentage.

Measuring the rate of return:

The rate of return from a portfolio for a given period, say one year can be measured as follows:

$$\text{Rate of return} = \frac{\text{Dividend Income} + \text{Terminal Value} - \text{Initial value}}{\text{Initial value} \times 100}$$

Example:

Let us calculate the rate of return of a portfolio with the following values:

Initial market value of the portfolio = Rs100,000

Dividend and interest income received till the end of the year = Rs.15,000

Terminal market value of the portfolio = Rs.102,000

$$\text{Rate of return} = \frac{(\text{Rs}15{,}000 + \text{Rs}102{,}000 - \text{Rs}100{,}000) \times 100}{\text{Rs}100{,}000}$$

$$= 17\%$$

There are also other measures of calculating returns like arithmetic average measure, internal rate of return measure etc.

NOTES

8.5.2 RISK

Measures of Risk - Variance and Standard Deviation

Risk reflects the chance that the actual return on an investment may be very different than the expected return. One way to measure risk is to calculate the variance and standard deviation of the distribution of returns.

Consider the probability distribution for the returns on stocks A and B provided below.

State	Probability	Return on Stock A	Return on Stock B
1	20%	5%	50%
2	30%	10%	30%
3	30%	15%	10%
3	20%	20%	-10%

The expected returns on stocks A and B were calculated on the Expected Return page. The expected return on Stock A was found to be 12.5% and the expected return on Stock B was found to be 20%.

Given an asset's expected return, its variance can be calculated using the following equation:

$$Var(R) = \sigma^2 = \sum_{i=1}^{N} p_i (R_i - E[R])^2$$

where

- N = the number of states,
- p_i = the probability of state i,
- R_i = the return on the stock in state i, and
- $E[R]$ = the expected return on the stock.

The standard deviation is calculated as the positive square root of the variance.

$$SD(R) = \sigma = \sqrt{\sigma^2} = (\sigma^2)^{\frac{1}{2}}$$

NOTES

Variance and Standard Deviation on Stocks A and B
Note: $E[R_A] = 12.5\%$ and $E[R_B] = 20\%$

Stock A

$$\sigma_A^2 = .20(.05 \quad .125)^2 + .30(.10 \quad .125)^2 + .20(.15 \quad .125)^2 + .20(.20 \quad .125)^2 = .00263$$

$$\sigma_A = \sqrt{.00263} = .0512 = 5.12\%$$

Stock B

$$\sigma_B^2 = .20(.50 \quad .20)^2 + .30(.30 \quad .20)^2 + .30(.10 \quad .20)^2 \quad .20(.10 \quad .20)^2 = .04200$$

$$\sigma_B = \sqrt{.04200} = .2049 = 20.49\%$$

Although Stock B offers a higher expected return than Stock A, it also is riskier since its variance and standard deviation are greater than Stock A's. This, however, is only part of the picture because most investors choose to hold securities as part of a diversified portfolio.

BETA

The beta for a stock is defined as follows:

where

- $?_{im}$ = the Covariance between the returns on asset i and the market portfolio and
- $?^2_m$ = the Variance of the market portfolio.

Note that, by definition, the beta of the market portfolio equals 1 and the beta of the risk-free asset equals 0.

An asset's systematic risk, therefore, depends upon its covariance with the market portfolio. The market portfolio is the most diversified portfolio possible as it consists of every asset in the economy held according to its market portfolio weight.

1. Find the expected return on a stock given that the risk-free rate is 6% the expected return on the market portfolio is 12% and the beta of the stock is 2.

   $E[R] = 6\% + (12\% - 6\%)2 = 18\%$

2. Find the beta on a stock given that its expected return is 16%, the risk-free rate is 4% and the expected return on the market portfoio is 12%

8.5.3 PEFORMANCE MEASURES

It is essentially the process of comparing the return earned on a portfo-

lio with the return earned on one or more other portfolio or on a benchmark portfolio. Portfolio evaluation essentially comprises of two functions, performance measurement and performance evaluation. Performance measurement is an accounting function which measures the return earned on a portfolio during the holding period or investment period. Performance evaluation , on the other hand, address such issues as whether the performance was superior or inferior, whether the performance was due to skill or luck etc.

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The ability of the investor depends upon the absorption of latest developments which occurred in the market. The ability of expectations if any, we must able to cope up with the wind immediately. Investment analysts continuously monitor and evaluate the result of the portfolio performance. The expert portfolio constructer shall show superior performance over the market and other factors. The performance also depends upon the timing of investments and superior investment analysts capabilities for selection. The evolution of portfolio always followed by revision and reconstruction. The investor will have to assess the extent to which the objectives are achieved. For evaluation of portfolio, the investor shall keep in mind the secured average returns, average or below average as compared to the market situation. Selection of proper securities is the first requirement. The evaluation of a portfolio performance can be made based on the following methods:

a) Sharpe's Measure

b) Treynor's Measure

c) Jensen's Measure

(a) Sharpe' Measure:

The objective of modern portfolio theory is maximization of return or minimization of risk. In this context the research studies have tried to evolve a composite index to measure risk based return. The credit for evaluating the systematic, unsystematic and residual risk goes to sharpe, Treynor and Jensen. Sharpe measure total risk by calculating standard deviation. The method adopted by Sharpe is to rank all portfolios on the basis of evaluation measure. Reward is in the numerator as risk premium. Total risk is in the denominator as standard deviation of its return. We will get a measure of portfolio's total risk and variability of return in relation to the risk premium. The measure of a portfolio can be done by the following formula:

$$SI = (Rt - Rf)/\acute{o}f$$

NOTES

Where,

SI = Sharpe's Index

Rt = Average return on portfolio

Rf = Risk free return

óf = Standard deviation of the portfolio return.

(b) Treynor's Measure:

The Treynor's measure related a portfolio's excess return to non-diversifiable or systematic risk. The Treynor's measure employs beta. The Treynor based his formula on the concept of characteristic line. It is the risk measure of standard deviation, namely the total risk of the portfolio is replaced by beta. The equation can be presented as follow:

$$T_n = (R_{n} - Rf)/â_m$$

Where, T_n = Treynor's measure of performance

R_n = Return on the portfolio

Rf = Risk free rate of return

$â_m$ = Beta of the portfolio (A measure of systematic risk)

(c) Jensen's Measure:

Jensen attempts to construct a measure of absolute performance on a risk adjusted basis. This measure is based on CAPM model. It measures the portfolio manager's predictive ability to achieve higher return than expected for the accepted riskiness. The ability to earn returns through successful prediction of security prices on a standard measurement. The Jensen measure of the performance of portfolio can be calculated by applying the following formula:

$$R_p = R_f + (R_{MI} - Rf) \times â$$

Where,

R_p = Return on portfolio

R_{MI} = Return on market index

R_f = Risk free rate of return

The M^2 measure

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M2 Performance Measure

The M^2 performance measure was developed by Leah Modigliani and famous economist Franco Modigliani as a replacement for the Sharpe Ratio. Even though the Sharpe Ratio is widely accepted as the best risk-adjusted performance measure, it was often thought to be too complicated for average investors, since they often regard returns in absolute terms, rather than in excess returns per unit of volatility.

The main idea behind the M^2 performance measure is to adjust all funds by leveraging or de-leveraging them using the risk free rate, so that they all have the same volatility. For example when we want to compare the returns of portfolio A with the market portfolio, the comparison might be complicated by the fact that the standard deviation is not the same. According to this method, we have to create a new portfolio B, that combines portfolio A with the risk free asset, so that the standard deviation is the same as the market portfolio.

If the standard deviation of the benchmark portfolio is higher than the portfolio's standard deviation, then one should take a short position in the risk free asset and a long position in the portfolio. While if the standard deviation of the portfolio is higher than benchmark's standard deviation, one should mix the portfolio with the risk free asset to equalize the standard deviation of the adjusted portfolio and the benchmark. One major criticism of this performance measure is that it does not correct for correlations between the portfolio and the benchmark. The

M^2 Measure => $M^2 = r_p^* - r_M$

Minimax Ratio

The MiniMax Ratio is the ratio between the expected excess return and its MiniMax risk measure. This ratio can be seen as a special case of a Conditional Sharpe Ratio.

MiniMax Risk Measure = maximum loss over all past observations.

Measuring the overall performance

Measuring the performance of the portfolio involves considering both risk and return. The most widely used measures of performance are Treynor's measure, the Sharpe measure, the Jensen measure and the M^2 measure.

Treynor's measure =>

Excess return on portfolio *p* Beta of portfolio *p*

Sharpe's measure =>

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(Average rate of return on portfolio p – Average rate of return on a risk free investment) Standard deviation of return of portfolio *p*

Jensen's measure =>

Average return on portfolio p – [Risk-free return + Portfolio Beta (Average return on market portfolio – Risk free return)]

M^2 Measure => $= r_p^* - r_M$

Where: r_p^* = return on adjusted portfolio whose volatility matches the volatility of the market index and r_M = return on the market index.

Minimax Ratio

Mini-Max Risk Measure = maximum loss over all past observations.

The above are the various activities in portfolio management.

8.5.4 SUMARY

Performance measurement is an accounting function which measures the return earned on a portfolio during the holding period or investment period. Performance evaluation , on the other hand, address such issues as whether the performance was superior or inferior, whether the performance was due to skill or luck etc.

8.6 PORTFOLIO REVISION

Portfolio management involves deciding what assets to include in the portfolio, given the goals of the portfolio owner and changing economic conditions. Selection involves deciding what assets to purchase, how many to purchase, when to purchase them, and what assets to divest. These decisions always involve some sort of performance measurement, most typically expected return on the portfolio, and the risk associated with this return (i.e. the standard deviation of the return). Typically the expected return from portfolios of different asset bundles is compared.

8.6.1 NEED FOR PORTFOLIO REVISION

Portfolio needs periodic maintenance and revision because

- Ø The needs of the beneficiary will change
- Ø The relative merits of the portfolio components will change
- Ø To keep the portfolio in accordance with the investment policy statement and investment strategy

8.6.2 TECHNIQUE

NOTES

An active management policy can be followed in which the composition of the portfolio is dynamic. The portfolio manager periodically changes the portfolio components or the components' proportion within the portfolio. A passive management strategy is one in which the portfolio is largely left alone.

Portfolio Rebalancing

Portfolio rebalancing involves reviewing and revising the portfolio composition. (ie) the stock-bond mix). There are three basic policies with respect to portfolio rebalancing; buy and hold policy, constant mix policy, and portfolio insurance policy.

Buy and Hold

Investors who use a buy and hold strategy set their initial allocation weights and then do nothing. Such allocations are directly related to the market performance of risky assets, and using them implies that risk tolerance is directly related to wealth and market returns.

Consider a 60/40 split between stocks and the risk-free asset. As the stock market rises (falls), stocks represent a larger (smaller) weight in the portfolio and The risk-free asset provides a floor value. Returns are directly related to market performance in a linear relationship.

When markets are trending, buy and hold methods can perform well because the better performing assets get increasingly larger weights and poor-performing assets have less impact.

Constant-mix

Constant mix rebalancing is a dynamic process that requires rebalancing to the intial target allocation by trading whenever market conditions alter the ideal balance. The strategy ensures that the portfolio's risk characteristics remain stable over time, consistent with a risk tolerance that varies proportionately to wealth.

Constant-mix strategies can be characterized as contrarian, as they sell the best-performing assets to buy the worst-performing. However, when markets are mean-reverting this will perform better than a buy and hold strategy. The shape of returns is concave – return increases at a decreasing rate in positive markets and decreases at an increasing rate in negative markets.

Constant Proportion

In a constant proportion strategy, the target allocation is a function of cushion, where cushion is the difference between the portfolio value and the

floor value, and the allocation to risky assets is the product of the cushion and the proportion (m).Â . A buy and hold strategy represents a special case in which m = 1. This strategy is consistent with having no risk tolerance if there is no cushion.

If m > 1, the strategy is known as constant proportion portfolio insurance, or CPPI. CPPI strategies buy more stocks when markets are rising and sell stocks as markets fall. The dynamic allocations also affect the floor value, as changing the weight of the risky asset necessitates an opposite-direction change in the floor value.

In strong bull markets, CPPI performs well by continually allocating more to stocks. In strong bear markets, CPPI avoids large losses by rapidly reducing the allocation to stocks. Such returns can be described as having a convex shape as the return increases at an increasing rate when market returns are positive and decreases at a decreasing weight when market returns are negative.

When markets are characterized by frequent reversals, the constant changes in allocation result in high transaction costs that erode performance.

Example:

A portfolio has a market value of $2 million. The investment policy statement requires a target asset allocation of 60 percent stock and 30 percent bonds.

Date	Portfolio Value	Actual Allocation	Stock	Bonds
1 Jan Rs.	2,000,000	60%/40%	Rs.1,200,000	Rs.800,000
1 AprRs	2,500,000	56%/44%	Rs1,400,000	Rs1,100,000

What amount of stock should the portfolio manager buy to rebalance this portfolio? What dollar amount of bonds should he sell?

Solution: a 60%/40% asset allocation for a Rs.2.5 million portfolio means the portfolio should contain Rs.1.5 million in stock and Rs1 million in bonds. Thus, the manager should buy Rs.100,000 worth of stock and sell Rs100,000 worth of bonds.

REBALANCING WITHIN THE EQUITY PORTFOLIO:

The below mentioned models can be employed for rebalancing of portfolio within the equity portfolio

1. **Constant proportion:** A constant proportion strategy within an equity portfolio requires maintaining the same percentage investment in each stock

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- May be mitigated by avoidance of odd lot transactions
- Constant proportion rebalancing requires selling winners and buying losers

2. **Constant beta:** A constant beta portfolio requires maintaining the same portfolio beta. To increase or reduce the portfolio beta, the portfolio manager can:
   - Reduce or increase the amount of cash in the portfolio
   - Purchase stocks with higher or lower betas than the target figure
   - Sell high- or low-beta stocks
   - Buy high- or low-beta stocks
3. **Change the portfolio components:** Changing the portfolio components is another portfolio revision alternative. Events sometimes deviate from what the manager expects:
   - The manager might sell an investment turned sour
   - The manager might purchase a potentially undervalued replacement security
4. **Indexing:** Indexing is a form of portfolio management that attempts to mirror the performance of a market index. Index funds eliminate concerns about outperforming the market. The tracking error refers to the extent to which a portfolio deviates from its intended behavior

COSTS INVOLVED IN PORTFOLIO REVISION:

Costs of revising a portfolio can:

- Be direct dollar costs
- Result from the consumption of management time
- Stem from tax liabilities
- Result from unnecessary trading activity
- Trading fees: Commissions and Transfer taxes
- Market impact: The market impact of placing the trade is the change in market price purely because of executing the trade. Market impact is a real cost of trading. Market impact is especially pronounced for shares with modest daily trading volume
- Management time: Most portfolio managers handle more than one account. Rebalancing several dozen portfolios is time consuming.
- Tax implications: Individual investors and corporate clients must pay

taxes on the realized capital gains associated with the sale of a security. Tax implications are usually not a concern for tax-exempt organizations.

8.6.3 FORMULA PLANS

The investor uses formula-plans to facilitate him in making decisions for the future by exploiting the fluctuations in prices. The three-formula plans which are useful in making decisions are

(a) The constant rupee value

(b) The constant ratio

(c) The variable ration formula plans

The formula plans have sketched the basis rules and regulations for purchasing and selling of investments. The formula plans make the average investors superior to others. These formula plans are based on the fact that the investors will not have the problem of forecasting fluctuation in stock prices and will continue to act according to formula.

The plans have a method of building two portfolios – the conservative portfolio and the aggressive portfolio. These plans are not flexible and are predetermined course of action specified for the investors.

Rules for formula plans

1. These plans work according to a methodology which is related for the working of each plan.
2. These plans cannot be used for short periods of time. The longer the period of holding the investments, the easier for formula plans to work.
3. Generally, the formula plans are strict, rigid and straight forward but they are not flexible.

These plans suggest that there must be two portfolios of an investor, namely aggressive portfolio of an investor namely aggressive portfolio and conservative portion. These plans do not have a selection procedure for the stocks. The methodology adopted by the formula plans is to find out the difference in movements of the aggressive portfolios and the conservative portfolios. The formula plans disclose that when the stocks must be purchased and sold.

An aggressive portfolio will determine the volatile nature of the portfolio and will have large number of fluctuations: whereas the conservative port-

folio will be planned portfolio is a mechanism of defensive operations. The two portfolios when combined together wm achieve the results as planned by the formulae.

Following are three – formulas plans that are found useful in making decisions

1. The Constant Rupee Value
2. The Constant Ratio
3. The Variable Ratio Formula Plans

Constant rupee value plan

This plan indicates the rupee value which remain constant in the stock portfolio of the total portfolio. This formula indicates the investor that whenever the stock value rises his shares should be sold to maintain a constant portfolio. If the price of the stock falls, the investor must buy additional stock to keep the value of aggressive portfolio constant. By specifying that the aggressive portfolio will remain constant in money value, the plan also specified that remainder of the total fund be invested in the conservative fund.

This formula plan also indicates to the investor how to place the action points. i.e. the period of time when action should be taken. The action points can be said to be a trade-of between stock and profitability. The action points can be said to be trade-of between stock and profitability. The action points can be said to be a trade – of between stock and profitability. The investor under the constant rupee value will require the knowledge of how 'low' the fluctuation may go but it does no require the forecasting of an upward movement or limit of price rise. So the forecasting by the investor is required even under the constant rupee value formula but the knowledge will be regarding the lower limits or the depression value of the fluctuations.

Constant ratio plan

Under the constant ration plan ,however ,both the aggressive and defensive portions remain in constant percentage of the portfolio total value . This plan method of identifying the ratio of the value in the aggressive portfolio to the value of he conservative portfolio. The aggressive portfolio divided by the market value of the total portfolio should be held constant. The constant ratio plan holder can adjust portfolio balance either at fixed intervals or when the portfolio moves away from the desired ratio by a fixed percentage.

The formula plan based on constant ratio does not investor to make forecasts of the lower levels at which the prices fluctuate. Under this plan, the aggressive value is alsays to be kept by the investor constant of the portfolio's take a long time to move in a direction which is either upwards/downwards, thus this plan does not work at its optimum value. under this plan, the investor will get high profits if there is a continuous sustained rise or fall in prices. These profits would be higher rather than under the constant rupee value plan or variable ratio plan. The main advantage of the constant ratio plan is the automation with which it forces the manager to adjust counter cyclically his portfolio.

Variable ratio plan

Under this plan, the ratios are varied whenever there is change in the economic or market index. The significant tool of the variable ratio plan is said to be forecasting. The investor is required to make forecasts in the range of fluctuations which more both above and below the median to find our the different ratios at different level of stock. The investor lower the aggressive portion of the total portfolio as stock prices rise and steadily increases the aggressive portion as stock prices fall. Whenever there is a growth trend for common stock, then the variations can be accounted for by exploiting the fluctuations around the long term trends.

It is clear from the above discussion, that formula plans are useful for making a decision on the timing of investments. They functions according to a methodology which is related fro the working of each plan. The utility of the formula plans call for the application of plans in a systematic and methodical manner. These plans enable the investors to assess the total amount that he must spend on purchases. The formula plans make the average investor who adopts thee techniques superior to other investors. These plans are based on the feet that the investor will not have the problem of forecasting fluctuation in stock prices and will continue plans, the investor must consider every stock that he puts in his portfolio with respect to growth potential of the securities

8.6.4 CONSTRAINTS ON PORTFOLIO REVISION

Portfolio revision involving purchase and sale of securities gives rise to certain problem which acts as constraints in portfolio revision, from those constraints some may be as following:

1. Statutory Stipulations: Investment companies and mutual funds manage the largest portfolios in every country. These institutional inves-

tors are normally governed by certain statutory stipulations regarding their investment activity. These stipulations often act as constraints in timely portfolio revision.

2. Transaction cost: Buying and selling of securities involve transaction costs such as commission and brokerage. Frequent buying and selling of securities for portfolio revision may push up transaction cost thereby reducing the gains from portfolio revision. Hence, the transaction costs involved in portfolio revision may act as a constraint to timely revision of portfolio.
3. Intrinsic difficulty: Portfolio revision is a difficult and time-consuming exercise. The methodology to be followed for portfolio revision is also not clearly established. Different approaches may be adopted for the purpose. The difficulty of carrying out portfolio revision it self may act as a restriction to portfolio revision.
4. Taxes: Tax is payable on the capital gains arising from sale of securities. Usually, long term capital gains are taxed at a lower than short-term capital gains. To qualify as long-term capital gain, a security must be held by an investor for a period not less than 12 months before sale. Frequent sales of securities in the course of periodic portfolio revision of adjustment will result in short-term capital gains which would be taxed at a higher rate compared to long-term capital gains. The higher tax on short-term capital gains may act as a constraint to frequent portfolios.

8.7 SUMMARY

Investing is a tradeoff between risk and expected return. In general, assets with higher expected returns are riskier. For a given amount of risk, MPT describes how to select a portfolio with the highest possible expected return. Or, for a given expected return, MPT explains how to select a portfolio with the lowest possible risk (the targeted expected return cannot be more than the highest-returning available security, of course, unless negative holdings of assets are possible.) MPT is therefore a form of diversification. Under certain assumptions and for specific quantitative definitions of risk and return, MPT explains how to find the best possible diversification strategy.

The capital asset pricing model (CAPM) is a *set* of predictions concerning equilibrium expected re-turns on risky assets. Harry Markowitz laid down

the foundation of modern portfolio man-agement in 1952. The CAPM was developed 12 years later in articles by William Sharpe (1964), John Lintner (1965), and Jan Mossin (1966). The time for this gestation indicates that the leap from Markowitz's portfolio selection model to the CAPM is not trivial.

We summarize the simplifying assumptions that lead to the basic version of the CAPM in the following list. The fundamental idea is that individuals are as alike as possible, with the notable exceptions of initial wealth and risk aversion. We will see that conformity of investor behaviour vastly simplifies our analysis.

Portfolio construction refers to the allocation of funds among a variety of financial assets open for investment. Portfolio theory concerns itself with the principles governing such allocation. The objective of the theory is to elaborate the principles in which the risk can be minimized subject to desired level of return on the portfolio or maximize the return, subject to the constraint of a tolerate level of risk.

Portfolio management involves deciding what assets to include in the portfolio, given the goals of the portfolio owner and changing economic conditions. Selection involves deciding what assets to purchase, how many to purchase, when to purchase them, and what assets to divest. These decisions always involve some sort of performance measurement, most typically expected return on the portfolio, and the risk associated with this return (i.e. the standard deviation of the return). Typically the expected return from portfolios of different asset bundles is compared.

8.8 ANSWERS TO CHECK YOUR PROGRESS

1. It is a theory of investment which attempts to maximize portfolio expected return for a given amount of portfolio risk or equivalently minimize risk for a given level of expected return.
2. According to CAPM, the market price compensates investors for taking systematic risk but not taking specific risk.
3. The SML is a line that graphs the systematic, or market risk versus return of the whole market at a certain time and shows all risky marketable securities.
4. The CML is express the graph of risk return relationship by measuring beta.

5. The market said to be efficient if prices in that market reflect all available information.
6. It is an alternative paradigm used to calculate equilibrium expected returns on financial assets.
7. TAA decisions could be made across aggregate asset classes, industry classifications or various broad economic sectors,
8. Sharpe Measure is total risk by calculating standard deviation.
9. It is measure related a portfolio's excess return to non-diversifiable or systematic risk.
10. Jensens attempts to measure to construct a measure of absolute performance on risk adjusted basis.

NOTES

8.10 REVIEW QUESTIONS

1. Explain the methods of selecting asset allocation mix.
2. What are the theories of portfolio strategy?
3. Explain the nature of the trading game.
4. Identify various measures of portfolio performance.

8.11 REFERENCES

1. INVESTMENT MANAGEMENT
   by Theory and Practice – Sultan chand and Sons.
2. PORTFOLIO MANAGEMENT
   by S. Kevin
3. SECURITY ANALYUSIS AND PORTFOLIO MANAGEMENT
   by S. Kevin
4. SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT
   by M. Renganatham and R. Madhumathi

UNIT IX

NOTES

MUTUAL FUNDS AND FINANCIAL INTERMEDIARIES

UNIT STRUCTURE

9.1 INTRODUCTION
9.2 CONCEPT
9.3 HOW MUTUAL FUNDS EARN MONEY
9.4 ORGANISATION OF A MUTUAL FUND
9.5 ADVANTAGES
9.6 TYPES OF MUTUAL FUND SCHEMES
9.7 MUTUAL FUND FEES
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9.9 WHAT IS MEANT BY ENTRY AND EXIT LOAD?
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9.1 INTRODUCTION

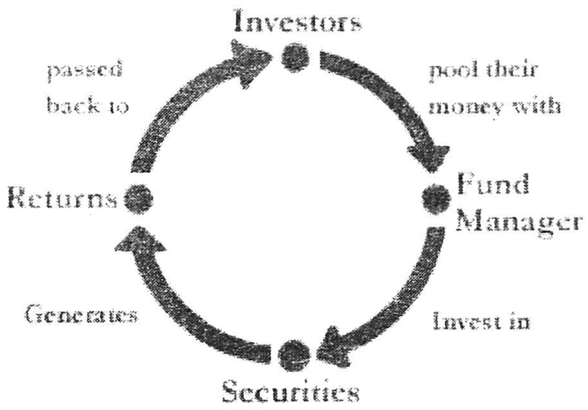
A mutual fund is a professionally-managed type of collective investment scheme that pools money from many investors to buy securities (stocks, bonds, short-term money market instruments, and/or other securities). A mutual fund has a fund manager that trades (buys and sells) the fund's investments in accordance with the fund's investment objective.

9.2 CONCEPT

A Mutual Fund is a trust that pools the savings of a number of investors who share a common financial goal. The money thus collected is then invested in capital market instruments such as shares, debentures and other securities. The income earned through these investments and the capital appreciation realized are shared by its unit holders in proportion to the number of units owned by them.

Thus a Mutual Fund is the most suitable investment for the common man as it offers an opportunity to invest in a diversified, professionally managed basket of securities at a relatively low cost. The flow chart below describes broadly the working of a mutual fund

Mutual Fund Operation Flow Chart



9.3 HOW MUTUAL FUNDS EARN MONEY

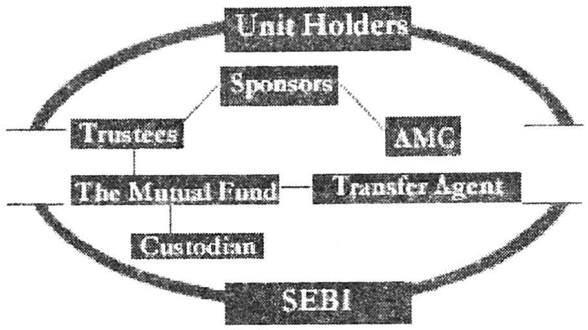
A mutual fund is a means of investing that enables individuals to share the risks of investing with other investors. All contributors to the fund experience an equal share of gains and losses for each dollar invested.

A mutual fund owns the securities of several corporations. A mutual fund pools money from hundreds and thousands of investors to construct a portfolio of stocks, bonds, real estate, or other securities, according to the kind of investments the mutual fund trades. Investors purchase shares in the mutual fund as if it was an individual security. Fund managers hired by the mutual fund company are paid to invest the money that the investors have placed in the fund. Heeding the adage "Don't put all your eggs in one basket" the holders of mutual fund shares are able to gain the advantage of diversification which might be beyond their financial means individually.

9.4 ORGANISATION OF A MUTUAL FUND

There are many entities involved and the diagram below illustrates the organisational set up of a mutual fund:

NOTES



- **Mutual Fund Shareholders:** The Mutual Fund Shareholders, like the other share holders have the right to vote. The voting rights include, the right to elect directors during the directorial elections, voting right to approve the alterations investment advisory contract pertaining to the fund and provide approval for changing investment objectives or policies.
- **Board of directors:** The Board of directors supervise the functional activities, which include approval of the contract Asset Management Company and other various service providers.
- **Investment management company or Asset Management Company:** This body handles the mutual fund portfolio as per the objectives and policies mentioned in the prospectus of the mutual funds.
- **Custodians:** The custodians protect the portfolio securities. Mostly qualified bank custodians are used for mutual funds.
- **Transfer Agents:** The transfer agent for the purpose of maintaining records and similar functions. The maintenance of the shareholder's accounts, calculation of dividends to the be disbursed, sending information to the shareholders about the account statements, notices, and income tax information. Some of the transfer agent sends information to the share holders about the shareholder transactions and account balances. They also maintain customer service departments in order the cater to the queries of the shareholders.
- **SEBI:** The primary aim of the Securities Exchange Board of India is to protect the interest of the mutual fund investors. The SEBI has formulated several policies for better functioning and controls the mutual funds. In the year 1993. SEBI issued guidelines pertaining to the mutual funds. All mutual funds, private sector and public

sector are regulated by the guidelines of the SEBI. The Asset **Management Company managing the funds has to be approved by the SEBI.**

9.5 ADVANTAGES

- Diversification: The best mutual funds design their portfolios so individual investments will react differently to the same economic conditions. For example, economic conditions like a rise in interest rates may cause certain securities in a diversified portfolio to decrease in value. Other securities in the portfolio will respond to the same economic conditions by increasing in value. When a portfolio is balanced in this way, the value of the overall portfolio should gradually increase over time, even if some securities lose value.
- Professional Management:Most mutual funds pay topflight professionals to manage their investments. These managers decide what securities the fund will buy and sell.
- Regulatory oversight: Mutual funds are subject to many government regulations that protect investors from fraud.
- Liquidity: It's easy to get your money out of a mutual fund. Write a check, make a call, and you've got the cash.
- Convenience: You can usually buy mutual fund shares by mail, phone, or over the Internet.
- Low cost: Mutual fund expenses are often no more than 1.5 percent of your investment. Expenses for Index Funds are less than that, because index funds are not actively managed. Instead, they automatically buy stock in companies that are listed on a specific index
- Transparency
- Flexibility
- Choice of schemes
- Tax benefits
- Well regulated

9.6 TYPES OF MUTUAL FUND SCHEMES

Wide variety of Mutual Fund Schemes exist to cater to the needs such as financial position, risk tolerance and return expectations etc. The table below gives an overview into the existing types of schemes in the Industry.

- **By Structure**
  - o Open - Ended Schemes
  - o Close - Ended Schemes
  - o Interval Schemes
- **By Investment Objective**
  - o Growth Schemes
  - o Income Schemes
  - o Balanced Schemes
  - o Money Market Schemes
- **Other Schemes**
  - o Tax Saving Schemes
  - o Special Schemes
    - § Index Schemes
    - § Sector Specific Schemes

(A) By Structure

Open-Ended Schemes

These do not have a fixed maturity. You deal with the Mutual Fund for your investments and redemptions. The key feature is liquidity. You can conveniently buy and sell your units at Net Asset Value(NAV) related prices, at any point of time.

Check your Progress

1. What is Mutual Funs?
2. What is Open Ended Funds?

Closed ended schemes

Schemes that have a stipulated maturity period (ranging from 2 to 15 years) are called close ended schemes. You can invest in the scheme at the time of the initial issue and thereafter you can buy or sell the units of the scheme on the stock exchanges where they are listed. The market price at the stock exchange could vary from the scheme's NAV on account of demand and supply situation, unit-holders' expectations and other market factors. One of the characteristics of the close-ended schemes is that they are generally traded at a discount to NAV; but closer to maturity, the discount narrows. Some close-ended schemes give you an additional option of selling your units to the Mutual Fund through periodic repurchase at NAV related prices. SEBI Regulations ensure that at least one of the two exit routes are provided to the investor under the close ended schemes.

Interval Schemes

These combine the features of open-ended and close-ended schemes. They may be traded on the stock exchange or may be open for sale or redemption during predetermined intervals at NAV related prices.

(B) By Investment Objective

Growth Schemes

Aim to provide capital appreciation over the medium to long term. These schemes normally invest a majority of their funds in equities and are willing to bear short term decline in value for possible future appreciation.

These schemes are not for investors seeking regular income or needing their money back in the short term.

Income Schemes

Income Schemes Aim to provide regular and steady income to investors. These schemes generally invest in fixed income securities such as bonds and corporate debentures. Capital appreciation in such schemes may be limited.

Ideal for:

· Retired people and others with a need for capital stability and regular income.

· Investors who need some income to supplement their earnings.

Balanced Schemes

Aim to provide both growth and income by periodically distributing a part of the income and capital gains they earn. They invest in both shares and fixed income securities in the proportion indicated in their offer documents. In a rising stock market, the NAV of these schemes may not normally keep pace or fall equally when the market falls.

Ideal for:

Investors looking for a combination of income and moderate growth.

Money Market / Liquid Schemes

Aim to provide easy liquidity, preservation of capital and moderate income. These schemes generally invest in safer, short term instruments such as treasury bills, certificates of deposit, commercial paper and interbank call money. Returns on these schemes may fluctuate, depending upon the interest rates prevailing in the market.

Ideal for:

Corporates and individual investors as a means to park their surplus funds for short periods or awaiting a more favourable investment alternative.

C) OTHER SCHEMES

Tax Saving Schemes (Equity Linked Saving Scheme - ELSS)

These schemes offer tax incentives to the investors under tax laws as prescribed from time to time and promote long term investments in equities through Mutual Funds.Eligible for deduction under section 80C .Lock in period three years

Ideal for:

Investors seeking tax incentives.

Special Schemes

This category includes index schemes that attempt to replicate the performance of a particular index such as the BSE Sensex, the NSE 50 (NIFTY) or sector specific schemes which invest in specific sectors such as

Technology, Infrastructure, Banking, Pharma etc.Besides, there are also schemes which invest exclusively in certain segments of the capital market, such as Large Caps, Mid Caps, Small Caps, Micro Caps, 'A' group shares, shares issued through Initial Public Offerings (IPOs), etc.

Index fund Index fund schemes are ideal for investors who are satisfied with a return approximately equal to that of an index.

Sectoral fund schemes

Sectoral fund schemes are ideal for investors who have already decided to invest in a particular sector or segment.

Fixed Maturity Plan

Fixed Maturity Plans (FMPs) are investment schemes floated by mutual funds and are close ended with a fixed tenure, the maturity period ranging from one month to three/five years. These plans are predominantly debt-oriented, while some of them may have a small equity component. The objective of such a scheme is to generate steady returns over a fixed-maturity period and protect the investor against market fluctuations.

FMPs are typically passively managed fixed income schemes with the fund manager locking into investments with maturities corresponding with the maturity of the plan. FMPs are not guaranteed products.

Exchange Traded Funds

Exchange Traded Funds are essentially index funds that are listed and traded on exchanges like Index fund schemes are ideal for investors who are satisfied with a return approximately equal to that of an index. Globally, ETFs

have opened a whole new panorama of investment opportunities to retail as well as institutional investors. ETFs enable investors to gain broad exposure to entire stock markets as well as in specific sectors with relative ease, on a real-time basis and at a lower cost than many other forms of investing.

An ETF is a basket of stocks that reflects the composition of an index, like S&P CNX Nifty, BSE Sensex, CNX Bank Index, CNX PSU Bank Index, etc. The ETF's trading value is based on the net asset value of the underlying stocks that it represents. It can be compared to a stock that can be bought or sold on real time basis during the market hours. The first ETF in India, Benchmark Nifty Bees, opened for subscription on December 12, 2001 and listed on the NSE on January 8, 2002.

Capital Protection Oriented Schemes

Capital Protection Oriented Schemes are schemes that endeavour to protect the capital as the primary objective by investing in high quality fixed income securities and generate capital appreciation by investing in equity / equity related instruments as a secondary objective. The first Capital Protection Oriented Fund in India, Franklin Templeton Capital Protection Oriented Fund opened for subscription on October 31,

2006. Gold Exchange Traded Funds offer investors an innovative, cost-efficient and secure way to access the gold market. Gold ETFs are intended to offer investors a means of participating in the gold bullion market by buying and selling units on the Stock Exchanges, without taking physical delivery of gold. The first Gold ETF in India, Benchmark GETF, opened for subscription on February 15, 2007 and listed on the NSE on April 17, 2007.

Check your Progress

3. What are Closed Ended funds?
4. What is Net Asset Value?
5. What is Entry and Exist Load?

Quantitative Funds

A quantitative fund is an investment fund that selects securities based on quantitative analysis. The managers of such funds build computer based models to determine whether or not an investment is attractive. In a pure "quant shop" the final decision to buy or sell is made by the model. However, there is a middle ground where

the fund manager will use human judgment in addition to a quantitative model. The first Quant based Mutual Fund Scheme in India, Lotus Agile Fund opened for subscription on October 25, 2007.

Funds Investing Abroad

With the opening up of the Indian economy, Mutual Funds have been permitted to invest in foreign securities/ American Depository Receipts (ADRs)

/ Global Depository Receipts (GDRs). Some of such schemes are dedicated funds for investment abroad while others invest partly in foreign securities and partly in domestic securities. While most such schemes invest in securities across the world there are also schemes which are country specific in their investment approach.

Fund of Funds (FOFs)

Fund of Funds are schemes that invest in other mutual fund schemes. The portfolio of these schemes comprise only of units of other mutual fund schemes and cash / money market securities/ short term deposits pending deployment. The first FOF was launched by Franklin Templeton Mutual Fund on October 17, 2003. Fund of Funds can be Sector specific e.g. Real Estate FOFs, Theme specific e.g. Equity FOFs, Objective specific e.g. Life Stages FOFs or Style specific e.g. Aggressive/ Cautious FOFs etc.

9.7 MUTUAL FUND FEES

In order to cover their expenses mutual funds charge fees to the investors. Although these fees are only a few percentage points a year and seem like a minor expense, they create a serious drain on the performance over a period of years.

Some fees to consider are:

Redemption fees

A mutual fund may charge fees when the investor sells shares back to the mutual fund.

Contingent deferred sales charge

A mutual fund may charge sales charges that are reduced at certain time intervals. For example, the fund may charge 6% of the sale price the first year after the shares is bought. Each year thereafter the fee would be reduced by 1% until no fee would be charged. This is an incentive for investors to leave their money in the fund.

Management fees

Mutual funds may charge fees to cover expenses such as advertising, brokers' costs and toll-free telephone lines. These are 12b-1 fees, regulated by law.

Transfer fees

A fee is charged each time the investor transfers money within the company.

9.8 NET ASSET VALUE

The term *Net Asset Value* (NAV) refers to the price per share of a mutual fund or the per-share value of an exchange-traded fund (ETF). The value is calculated by dividing the total net value of the securities by the number of shares in the fund. The net asset value functions in a similar way to a stock price in that it measures the value of a single share and can be used to compare fund performance against benchmarks. Net asset value is calculated at the close of market each day and is derived from the current market prices of the fund's underlying securities.

Calculating the Net Asset Value

The net asset value of a mutual fund reflects the market value of all securities (e.g. stocks, bonds, cash) owned by the fund, less its total liabilities. That total is then divided by the number of shares outstanding, since NAV is typically issued on a per share basis. The net asset value, then, is the price per share of the fund.

The formula for net asset value can be written as:

$$NAV = \frac{\text{Fair Market Value of Scheme's Investment + Receivables + Accrued income + other assets − accrued expenses − payables − other liabilities}}{\text{Number of units outstanding}}$$

9.9 WHAT IS MEANT BY ENTRY AND EXIT LOAD?

Loads are basically charges levied on your mutual fund investments which are basically recovery of sales, distribution & processing charges related to your investments.

An Entry load is a charge levied at the time of making investments so as to cover the expenses for sales, distribution and processing costs. It is the expense an investor has to bear while enterting into mutual fund investment. However, not all funds have entry load and the same expense every mutal fund is different. A major portion of the Entry Load is used for paying commissions to the distributor. Entry loads increase the cost of buying an investment opportunity.

An Exit Load is a charge levied at the time of exiting mutual fund investment. Not all schemes have an Exit Load nor are the exit loads same for all schemes. Exit Loads depend upon the time period fro which an investor stayed invested.

Generally, if the investor exits early, he will have to bear more Exit Load and if he remains invested for a longer period of time, his Exit Load will reduce. Thus the longer the investor remains invested, lesser is the Exit Load. After some time the Exit Load reduces to nil; i.e. if the investor exits after a specified time period.

9.10 MUTUAL FUND PROSPECTUS

The prospectus is a legal document that includes information about the mutual fund. In this document you will find information about the terms of the offer, the issuer, and its objectives. In the aftermath of the 1929 stock market crash the federal government in the Securities Act of 1933 required security companies to publish a prospectus. At first glance a prospectus may seem overwhelming. The information in the prospectus is usually lengthy, packed with tables and graphs, and written in technical and legal language. This document is provided to help you make an informed investment decision before you invest in a mutual fund.

To gain the essential information you need, pay close attention the following key sections:

Investment Objective

A short statement of the fund's investment objectives. Some funds intend to achieve short-term growth while others might focus on long-term stability.

Investment Strategy

Exactly how the fund plans to accomplish the objectives. This section describes the types of assets that the fund purchases.

Fees and Expenses

Although mutual funds aim to make money for their investors, their ultimate goal, just like any other business, is to make money for themselves. In order to do so, funds charge their shareholders a variety of fees and expenses, all of which must be documented in the prospectus. A table at the front of every prospectus contains a breakdown of the different fees and expenses, along with a hypothetical projection of how the fees would impact a $10,000 investment over a 10-year period. This enables you to compare fees and expenses across mutual funds.

Account Information

This section contains very basic information about how to buy and sell

shares and other account-related information. In addition to telling you how to get your money into the fund, the prospectus will also tell you how to take it out of the fund. The prospectus will inform you which redemption methods are available to you.

Risks

The level of risk that the fund takes and the risks that are associated with the specific investments made by the fund are one of the most important sections in the prospectus.

Performance

Information about the fund's performance over the last 10 years is included. Investors should be aware that past performance is not necessarily an indicator of future results. As important is how well the fund has traditionally performed compared to an index, such as the S&P 500. A fund's performance is also related to the fund's volatility, dividend payments, and turnover.

Management

The names the managers and some additional information about their experience and qualifications is reported. It can be helpful to know whether or not they have managed other funds in the past and their success or failure in order to get a sense of their past strategies and results.

Statement of Additional Information

Mutual funds split their prospectuses into two parts — the "prospectus" (described above) and the Statement of Additional Information (SAI). In 1983, the Securities and Exchange Commission required mutual funds to supply much more detailed information about the fund. These are included in the SAI. For legal purposes it is assumed that you have read it. If you don't receive the SAI with the prospectus, you should request one. It provides great detail about the fund's board of directors, any limitations on the fund's investments, and the fees and expenses that are mentioned in the prospectus.

Mutual Fund Share Classes

MorningStar is a generally accepted authority on divides most stocks into classes or types. The use eight type designations: Distressed, Hard Asset, Cyclical, Speculative Growth, Aggressive Growth. Classic Growth, Slow Growth and High Yield. Each designation defines a broad category of investment characteristics. Stocks are assigned to a type based on objective financial criteria and MorningStar's proprietary algorithm, so stocks of the same type

have similar economic fundamentals. Every stock has individual idiosyncrasies, but in general, when evaluating investments, many of the same concerns and evaluation methods will apply across the stocks in one type. By establishing stock types one has an easy way to narrow down the stock universe to those best filling specific investment needs. Stock Types also help you quickly determine the diversification level of portfolios. For instance, you might discover that most of your holdings are categorized as Speculative Growth. If you want to lessen the portfolio's risk, you could invest in other types of stocks.

Morning Star's classes/types are:

Distressed

These companies are having serious operating problems. This could mean declining cash flow, negative earnings, high debt, or some combination of these. Such "turnaround" stocks tend to be highly risky but also harbor some intriguing investments.

Hard Asset

These companies' main businesses revolve around the ownership or exploitation of hard assets like real estate, metals, timber, etc. Such companies typically sport a low correlation with the overall stock market and investors have traditionally looked to them for inflation hedges.

Cyclical

Cyclical companies core businesses can be expected to fluctuate in line with the overall economy. In a booming economy such companies will look excellent; in a recession, their growth stalls, and they might even lose money.

Speculative Growth

Don't expect consistency from speculative growth-companies. At best their profits are spotty. At worst they lose money. In fact, many companies never make it beyond speculative growth, going instead to bankruptcy court. That's why they're speculative. But current profitability isn't what makes speculative-growth companies interesting. It's future profits. Hopefully, a speculative-growth company will eventually blossom into a world-class company.

Aggressive Growth

Aggressive-growth companies show a bit more maturity than their speculative-growth counterparts: They post rapid growth in profits, not just in sales-a sign of more staying power. At this point, it's time to make some money.

Classic Growth

These firms are in their prime and have little left to prove. The best classic growers have blossomed into money machines, churning out steady growth, high returns on capital, positive free cash flows, and rising dividends. The catch is, their growth is nowhere near that of the aggressive-growth group.

Slow Growth and High Yield

The growth of these companies is a fading memory. Having run out of attractive investment opportunities, most of them pay out the bulk of their earnings in dividends expect - high payout ratios - rather than plow the profits back into their businesses.

9.11 KINDS OF MUTUAL FUNDS

Most funds have a particular strategy they focus on when investing. For instance, some invest only in Blue Chip companies that are more established and are relatively low risk. On the other hand, some focus on high-risk start up companies that have the potential for double and triple digit growth. Finding a mutual fund that fits your investment criteria and style is important.

Kinds of Mutual Fund Schemes

Value stocks

Stocks from firms with relative low Price to Earning (P/E) Ratio, usually pay good dividends. The investor is looking for income rather than capital gains.

Growth stock

Stocks from firms with higher low Price to Earning (P/E) Ratio, usually pay small dividends. The investor is looking for capital gains rather than income.

Based on company size, large, mid, and small cap

Stocks from firms with various asset levels such as over $2 Billion for large; in between $2 and $1 Billion for mid and below $1 Billion for small.

Income stock

The investor is looking for income which usually come from dividends or interest. These stocks are from firms which pay relative high dividends. This fund may include bonds which pay high dividends. This fund is much like the value stock fund, but accepts a little more risk and is not limited to stocks.

Index funds

The securities in this fund are the same as in an Index fund such as the Dow Jones Average or Standard and Poor's. The number and ratios or securities are maintained by the fund manager to mimic the Index fund it is following.

Enhanced index

This is an index fund which has been modified by either adding value or reducing volatility through selective stock-picking.

Stock market sector

The securities in this fund are chosen from a particular marked sector such as Aerospace, retail, utilities, etc.

Defensive stock

The securities in this fund are chosen from a stock which usually is not impacted by economic down turns.

International

Stocks from international firms.

Real estate

Stocks from firms involved in real estate such as builder, supplier, architects and engineers, financial lenders, etc.

Socially responsible

This fund would invests according to non-economic guidelines. Funds may make investments based on such issues as environmental responsibility, human rights, or religious views. For example, socially responsible funds may take a proactive stance by selectively investing in environmentally-friendly companies or firms with good employee relations. Therefore the fund would avoid securities from firms who profit from alcohol, tobacco, gambling, pornography etc.

Balanced funds

The investor may wish to balance his risk between various sectors such as asset size, income or growth. Therefore the fund is a balance between various attributes desired.

Tax efficient

Aims to minimize tax bills, such as keeping turnover levels low or shying away from companies that provide dividends, which are regular payouts in cash or stock that are taxable in the year that they are received. These funds

still shoot for solid returns; they just want less of them showing up on the tax returns.

Convertible

Bonds or Preferred stock which may be converted into common stock.

Junk bond

Bonds which pay higher that market interest, but carry higher risk for failure and are rated below AAA.

Mutual funds of mutual funds

This funds that specializes in buying shares in other mutual funds rather than individual securities.

Closed end

This fund has a fixed number of shares. The value of the shares fluctuates with the market, but fund manager has less influence because the price of the underlining owned securities has greater influence.

Exchange traded funds (ETFs)

Baskets of securities (stocks or bonds) that track highly recognized indexes. Similar to mutual funds, except that they trade the same way that a stock trades, on a stock exchange.

9.12 LOAD VS. NO-LOAD FUNDS

Load funds are mutual funds that have sales charges. When an investor purchases shares of a mutual fund the investor pays a fee for the sale (transaction) of the shares. Sales charges are required by law to be no more than 8.5% of the price of the shares bought. A load fund is where the broker receives all his commission with the first funds received from the investor. Therefore the investor must pay the brokers commission completely before any of his funds go toward the purchase of shares.

No-load funds do not charge an upfront fee for the sale transaction. In a no-load fund the broker receives his commission as he receives the investor's funds and shares are purchased with the investor's initial fun

Mutual fund fees

In order to cover their expenses mutual funds charge fees to the investors. Although these fees are only a few percentage points a year and seem like a minor expense, they create a serious drain on the performance over a period of years.

Some fees to consider are:

Redemption fees

A mutual fund may charge fees when the investor sells shares back to the mutual fund.

Contingent deferred sales charge

A mutual fund may charge sales charges that are reduced at certain time intervals. For example, the fund may charge 6% of the sale price the first year after the shares are bought. Each year thereafter the fee would be reduced by 1% until no fee would be charged. This is an incentive for investors to leave their money in the fund.

Management fees

Mutual funds may charge fees to cover expenses such as advertising, brokers' costs and toll-free telephone lines. These are 12b-1 fees, regulated by law.

Transfer fees

A fee is charged each time the investor transfers money within the company.

Distribution of capital gains and dividends

After paying operating costs, the earnings and losses of the mutual fund are distributed to the investors in proportion to the amount of money invested. An investor may chose to receive dividends as cash, or he can reinvest them into the fund. Many funds will automatically reinvest dividends with the investor authorization.

Mutual fund taxation

The mutual fund manager must send the investor a tax information statement so the investor can declare taxes. The investor must account for all capital gains or loses and dividends even if the dividends and capital gains are reinvested into the mutual fund. When mutual funds shares are sold/redeemed the mutual fund manager should aid the investor in determining the purchase bases for the shares sold/redeemed. Recent federal tax codes have modified the treatment of dividends and capital gains depending on the investor's income level and tax bracket.

9.13 What is NET ASSET VALUE ?

The Term **Net Asset Value (NAV)** is used by investment companies to measure **net assets**. It is calculated by subtracting liabilities from the value of

a fund's securities and other items of value and dividing this by the number of outstanding shares.

Net asset value is popularly used in newspaper mutual fund tables to designate the price per share for the fund.The value of a collective investment fund based on the market price of securities held in its portfolio. Units in open ended funds are valued using this measure. Closed ended investment trusts have a net asset value but have a separate market value.

NAV per share is calculated by dividing this figure by the number of ordinary shares. Investments trusts can trade at **net asset value** or their price can be at a premium or discount to NAV.Value or purchase price of a share of stock in a mutual fund. NAV is calculated each day by taking the closing market value of all securities owned plus all other assets such as cash, subtracting all liabilities, then dividing the result (total net assets) by the total number of shares outstanding.

Calculating NAVs - Calculating mutual fund **net asset values** is easy. Simply take the current market value of the fund's net assets (securities held by the fund minus any liabilities) and divide by the number of shares outstanding. So if a fund had net assets of Rs.50 lakh and there are one lakh shares of the fund, then the price per share (or NAV) is Rs.50.00.**Role of funds in a consumer's portfolio·**

Growth and Inflation Hedge:

Traditional savings instruments cannot keep pace with inflation and the rising cost of living. They give only 3.5% in a savings accounts. You can use a mixture of mutual funds to achieve a better return than what you can get in a savings account

Source of Income:

Can provide you with income if you invest in an income or dividend paying fund, along with giving you a modest capital appreciation

How does it differ from Life Insurance Savings Product:

A mutual fund is a capital market investment product that gives you a return based on the amount of risk taken by you. Life insurance on the other hand is not an insurance product, but rather a protection product that will compensate your family or survivors in case something happens to you. There are some types of life insurance that have an investment feature attached to them. Please understand that such type of hybrids can be recreated by you by simply combining a pure life insurance product along with a mutual fund. And.

you will pay lesser in fees if you do this on your own, because these hybrids have much higher fees.These hybrids have a purpose in your portfolio if you are looking for some capital appreciation along with life/risk cover. Ultimately, you need to decide what your needs are and whether the product you are looking at meets your needs or not.

5 Vital Tips on Mutual Fundsv

Watch out for risks associated with Mutual Fundsv

Stay invested for longer period of timev

Watch out for fees associated with Mutual Fundsv

Always consider tax implications of your investmentsv

Low NAV doesn't mean cheap mutual fund 1.

Watch out for risks associated with Mutual Funds

Some types of mutual funds are more risky than others. Therefore, its important to know what the risks are and what your risk capacity is. Generally speaking, equity funds are the most risky. Debt funds are safer and money market funds are the safest. However, there is a relationship between risk and returns. Money market funds give you the lowest return because of their low risk. Equity funds will give you the chance of highest return to match their high risk.Some funds can balance their risks by investing in a combination of equity and debt instruments. The upside will not be as good as an equity fund, but the downside is protected because of the debt exposure in the fund.Always read the fund's offer document. Also, you should ask your agent about the kind of risks in the recommended fund.**2.**

Stay invested for longer period of time

You should invest for at least 3-5 year time horizon, if investing in an equity fund, otherwise you will not enjoy the full benefit of your equity exposure. Don't make the mistake of selling all your equity funds if the market corrects. By waiting for a 3 year period you will give yourself enough time to not only recover your losses, but also increase your returns.For debt funds, the duration of holding can be lower because your returns are capped by the interest that the debt securities will be paying the fund.For money market funds, these are funds that you should invest in for short-term liquidity or cash needs.

3. Watch out for fees associated with Mutual Funds Entry load:

Fees paid when you invest in a fund. As per the revised SEBI regulation, the entry load on all the mutual fund schemes has been abolished with

effect from 1st August 2009**Exit load:** Fees charged when you sell your units. (Equity: 0.5% to 1% if withdrawn within one year, Nil if withdrawn after one year; Debt: Nil to 0.6% if withdrawn within one year, Nil if withdrawn after one year: Money Market: Nil)**Annual management fees:**Annual management fees paid to the asset management company. (Depending upon type of fund (equity or debt), these fees range between 1.0% and 2.5% of assets under management (AUM), depending on fund type and AUM in the fund)Annual management fees result in a lower NAV at the end of the year. **4.**

Always consider tax implications of your investments

Like other investments, mutual funds also have tax implications. Each time you sell your units or receive dividends, there could be a tax liability associated with such transactions. So, be careful about when you are exiting your investments as you might incur a cash outflow to the Income Tax Authority **5.**

Low NAV doesn't mean cheap mutual fund

It is a popular misconception that low mutual fund NAV means cheap fund and so a fund with a low NAV is better than a high NAV. For instance, many feel that Rs 10 NFO is a good fund to invest because you are getting it for cheap.On the contrary, a high NAV just means that the fund owns securities that have risen in value since the fund started investing in them.

9.14 MAJOR MUTUAL FUND COMPANIES IN INDIA

ABN AMRO Mutual Fund

Birla Sun Life Mutual Fund

Bank of Baroda Mutual Fund (BOB Mutual Fund`

HDFC Mutual Fund

HSBC Mutual Fund

ING Vysya Mutual Fund

Prudential ICICI Mutual Fund

Sahara Mutual Fund

State Bank of India Mutual Fund

Tata Mutual Fund

KMAMC

Unit Trust of India Mutual Fund UTI

Bank of Baroda (BOB

Punjab National Bank (PNB),

State Bank of India (SBI),

and Life Insurance Corporation of India (LIC).

Reliance Mutual Fund (RMF)

Morgan Stanley Investment Management (MISM)

Morgan Stanley Investment Management Private Limited (MSIM India)

Morgan Stanley Mutual Fund (MSMF).

AMC, the Alliance Capital Asset Management India (Pvt) Ltd.

LIC Mutual Fund Life Insurance Corporation of India set up LIC

GIC Mutual Fund by General Insurance Corporation of India (GIC)

The New India Assurance Co. Ltd. (NIA),

The Oriental Insurance Co. Ltd (OIC) and

United India Insurance Co. Ltd. (UII)

9.15 BEST MUTUAL FUNDS - SELECTION

The selection of Mutual Funds is highly critical for various reasons· The Mutual Fund are investments in multiple securities· Every single share of a mutual fund is like a small investment in thousands of stocks and bonds · The advantages of the mutual funds are that they allow small investors to put their money in a large variety of securities· The Mutual Funds charges administrative fees to all the shareholders, which becomes a discouraging factor for small investors

Best Mutual Funds - Characteristics·

Low administrative fees:

The administrative fees, front-end loads, and management fees are some of the fees charged on the investments. These fees considerably lower the return from investments. In case the performance varies, the fees remain constant. It is wise to invest in a mutual fund with low administrative fees rather than a mutual fund which is performing superbly for the past three to four years.·

Experienced management:

The Fund Manager pertaining to the Mutual Funds, also referred as the portfolio manager trades, realizes the capital losses and gains, and collects the

income in form of interest. A lot depends on the manager, as one who is inexperienced without any previous record of performance may deliver well, but there is guarantee, whereas a manager with a performance record has proved his worth.

Above average performance:

Investors look for mutual funds, which have preformed well for the past three to four years, but the problem is that there is no guarantee that it would perform in the same manner at present. It is wiser to invest in those funds which have performed better than those having higher returns.

How to Pick a Mutual Fund

Many investors try to pick mutual funds based solely on the funds' past performance. However the advertised stellar performance is not a guarantee of future success, especially when it comes to relatively new or small funds. When you pick a mutual fund you should also consider other factors such as:

age and size of the fund; Before considering investing in a particular fund read the prospectus to see since when it has been operating and what its asset size is. Often while funds are still small just a few successful stocks can have a great impact on their performance and lead to excellent short-term performance records. However, as funds grow such great results are more difficult to sustain since a larger number of stocks are owned by the fund and they cannot influence the fund's performance that easily.

fund's risks; You should be well aware with the risks the fund takes in order to achieve its results. Higher rates of return are usually associated with higher risks, which may be beyond your comfort level or inconsistent with your financial goals. Always take into account your risk tolerance and long-term investment strategies when picking the right mutual fund for you.

fund's volatility; Typically, higher volatility means higher investment risk. Therefore if you are looking for a shorter-term investment you should avoid funds with a volatile history since you will not have much time to overcome eventual declines in the stock market.

fund's fees, sales charges and expenses; When you invest in a mutual fund you will be charged various fees and expenses. A low-cost fund may perform worse than a high-cost fund and still generate the same returns for you. Take your time to calculate how the costs of different mutual funds will affect your returns since even small differences in the fees and expenses may lead to large differences in the returns you get.

taxes that are due when you receive a distribution; Generally, you will owe taxes when you receive a capital gains distribution from a fund. Your tax bill will be affected even if the return has been negative since you invested in the fund so you should preliminarily find out when your fund will make its distributions and assess the right time to invest in it.

recent changes in the fund's operations. If the fund has recently changed its investment strategy or its investment adviser, its performance may change too. Therefore, always inform yourself about any recent changes in the fund's operations before considering investing in it. As you can see, many other factors besides the fund's past performance should be taken into account when deciding which mutual fund to pick. To get the most out of your money, whether you are interested in mutual funds, stocks, ETFs or options, you need two main things - the knowledge and the right trading platform.

9.16 SUMMARY

Net Asset Value (NAV)

Net Asset Value is the market value of the assets of the scheme minus its liabilities. The per unit NAV is the net asset value of the scheme divided by the number of units outstanding on the Valuation Date.

Sale Price

Is the price you pay when you invest in a scheme. Also called Offer Price. It may include a sales load.

Repurchase Price

Is the price at which units under open-ended schemes are repurchased by the Mutual Fund. Such prices are NAV related.

Redemption Price

Is the price at which close-ended schemes redeem their units on maturity. Such prices are NAV related.

Sales Load

Is a charge collected by a scheme when it sells the units. Also called, 'Front-end' load. Schemes that do not charge a load are called 'No Load' schemes.

Repurchase or 'Back-end' Load

Is a charge collected by a scheme when it buys back the units from the unitholders.

9.17 ANSWERS TO CHECK YOUR PROGRESS

1. A mutual funds is a professionally managed type of collective investment scheme that pools money from many investors to buy securities.
2. It can be conveniently buy and sell at NAV at any point of time.
3. Schemes that have a stipulated maturity period are called close ended schemes.
4. NAV refers to the priced per share of mutual fund or the per share value of an exchange traded fund.
5. Entry load is a charge levied at the time of existing mutual fund investment and Exit load is a charge levied at the time of existing mutual fund investment.

9.18 REVIEW QUESTIONS

1. Explain how Mutual funds are organised?
2. What are the various schemes of Mutual Funds ?
3. Explain in detail entry and Exit Load ?
4. What are the various kinds of Mutual Funds?
5. Explain the charactertistics of Best Mutual Funds.

9.19 REFERENCES

1. INVESTMENT MANAGEMENT
   by Theory and Practice – Sultan chand and Sons.
2. PORTFOLIO MANAGEMENT
   by S. Kevin
3. SECURITY ANALYUSIS AND PORTFOLIO MANAGEMENT
   by S. Kevin
4. SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT
   by M. Renganatham and R. Madhumathi

UNIT X

COMPUTER APPLICATIONS IN INVESTMENT MANAGEMENT

UNIT STRUCTURE

10.1 INTRODUCTION
10.2 GRAPHICAL USER INTEFACE
10.3 ROUTER
10.4 APPLICATIONS
10.5 SPREADSHEET
10.6 PROJECT
10.7 COMMON
10.8 EXECUTIVE SUPPORT SYSTEM
10.9 ANSWERS TO CHECK YOUR PROGRESS
10.10 REVIEW QUESTIONS
10.11 REFERENCES

UNIT OBJECTIVES

1. To know about the GUI concept
2. How to use Routers
3. Computer Applications in Port Folio

10.1 INTRODUCTION

A **computer** is a general purpose device that can be programmed to carry out a finite set of arithmetic or logical operations. Since a sequence of operations can be readily changed, the computer can solve more than one kind of problem.

Conventionally, a computer consists of at least one processing element, typically a central processing unit (CPU) and some form of memory. The processing element carries out arithmetic and logic operations, and a sequencing and control unit that can change the order of operations based on stored information. Peripheral devices allow information to be retrieved from an external source, and the result of operations saved and retrieved.

10.2 GRAPHICAL USER INTEFACE

In computing, a **graphical user interface** (**GUI**, commonly mis-pronounced gooey is a type of user interface that allows users to interact with

electronic devices using images rather than text commands. GUIs can be used in computers, hand-held devices such as MP3 players, portable media players or gaming devices, household appliances and office equipment. A GUI represents the information and actions available to a user through graphical icons and visual indicators such as secondary notation, as opposed to text-based interfaces, typed command labels or text navigation. The actions are usually performed through direct manipulation of the graphical elements.

10.3 ROUTER

A **router** is a device that forwards data packets between computer networks, creating an overlay internetwork. A router is connected to two or more data lines from different networks. When a data packet comes in one of the lines, the router reads the address information in the packet to determine its ultimate destination. Then, using information in its routing table or routing policy, it directs the packet to the next network on its journey. Routers perform the "traffic directing" functions on the Internet. A data packet is typically forwarded from one router to another through the networks that constitute the internetwork until it gets to its destination node.

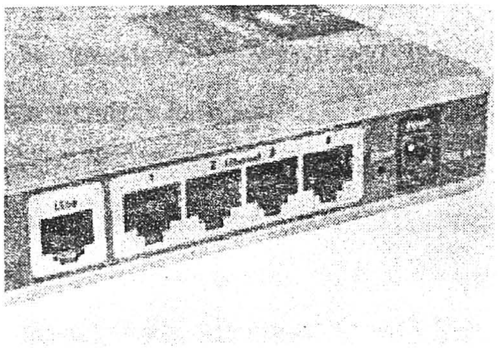
The most familiar type of routers are home and small office routers that simply pass data, such as web pages and email, between the home computers and the owner's cable or DSL modem, which connects to the Internet through an ISP. More sophisticated routers, such as enterprise routers, connect large business or ISP networks up to the powerful core routers that forward data at high speed along the optical fiber lines of the Internet backbone. Though routers are typically dedicated hardware devices, use of software-based routers has grown increasingly common.

10.4 APPLICATIONS

When multiple routers are used in interconnected networks, the routers exchange information about destination addresses, using a dynamic routing protocol. Each router builds up a table listing the preferred routes between any two systems on the interconnected networks. A router has interfaces for different physical types of network connections, (such as copper cables, fiber optic, or wireless transmission). It also contains firmware for different networking protocol standards. Each network interface uses this specialized computer software to enable data packets to be forwarded from one protocol transmission system to another.

Routers may also be used to connect two or more logical groups of computer devices known as subnets, each with a different sub-network address. The subnets addresses recorded in the router do not necessarily map directly to the physical interface connections. A router has two stages of operation called planes:

Control plane: A router records a routing table listing what route should be used to forward a data packet, and through which physical interface connection. It does these using internal pre-configured addresses, called static routes.



A typical home or small office router showing the ADSL telephone line and Ethernet network cable connections

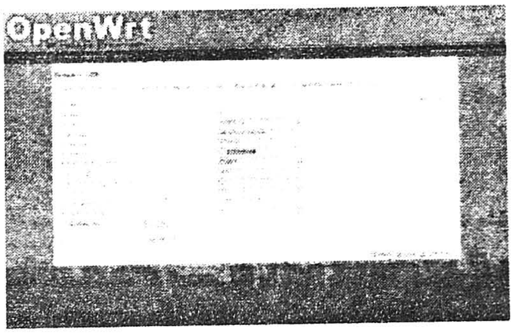
Check your Progress

1. What is Router?
2. What is a Spread Sheet application?

Forwarding plane: The router forwards data packets between incoming and outgoing interface connections. It routes it to the correct network type using information that the packet header contains. It uses data recorded in the routing table control plane.

Routers may provide connectivity within enterprises, between enterprises and the Internet, and between internet service providers (ISPs) networks. The largest routers (such as the CiscoCRS-1 or JuniperT1600) interconnect the various ISPs, or may be used in large enterprise networks.Smaller routers usually provide connectivity for typical home and office networks. Other networking solutions may be provided by a backbone Wireless Distribution System (WDS), which avoids the costs of introducing networking cables into buildings.

All sizes of routers may be found inside enterprises.The most powerful routers are usually found in ISPs, academic and research facilities. Large businesses may also need more powerful routers to cope with ever increasing demands of intranet data traffic. A three-layer model is in common use, not all of which need be present in smaller networks.



A screenshot of the LuCI web interface used by OpenWrt. This page configures Dynamic DNS.

Access routers, including 'small office/home office' (SOHO) models, are located at customer sites such as branch offices that do not need hierarchical routing of their own. Typically, they are optimized for low cost. Some SOHO routers are capable of running alternative free Linux-based firmwares like Tomato, OpenWrt or DD-WRT.

Distribution

Distribution routers aggregate traffic from multiple access routers, either at the same site, or to collect the data streams from multiple sites to a major enterprise location. Distribution routers are often responsible for enforcing quality of service across a WAN, so they may have considerable memory installed, multiple WAN interface connections, and substantial onboard data processing routines. They may also provide connectivity to groups of file servers or other external networks.

Security

External networks must be carefully considered as part of the overall security strategy. Separate from the router may be a firewall or VPN handling device, or the router may include these and other security functions. Many companies produced security-oriented routers, including Cisco Systems' PIX and ASA5500 series, Juniper's Net screen, Watch guard's Firebox, Barracuda's variety of mail-oriented devices, and many others.

Core

In enterprises, a core router may provide a "collapsed backbone" interconnecting the distribution tier routers from multiple buildings of a campus, or large enterprise locations. They tend to be optimized for high bandwidth, but lack some of the features of Edge Routers.[8]

Internet connectivity and internal use

Routers intended for ISP and major enterprise connectivity usually exchange routing information using the Border Gateway Protocol (BGP). RFC 4098standard defines the types of BGP-protocol routers according to the routers' functions:

Edge router: Also called a Provider Edge router, is placed at the edge of an ISP network. The router uses External BGP to EBGP protocol routers in other ISPs, or a large enterprise Autonomous System.

Subscriber edge router: Also called a Customer Edge router, is located at the edge of the subscriber's network, it also uses EBGP protocol to its provider's Autonomous System. It is typically used in an (enterprise) organization.

Inter-provider border router: Interconnecting ISPs, is a BGP-protocol router that maintains BGP sessions with other BGP protocol routers in ISP Autonomous Systems.

Core router: A *core router* resides within an Autonomous System as a back bone to carry traffic between edge routers.

Within an ISP: In the ISPs Autonomous System, a router uses internal BGP protocol to communicate with other ISP edge routers, other intranet core routers, or the ISPs intranet provider border routers.

"Internet backbone:" The Internet no longer has a clearly identifiable backbone, unlike its predecessor networks. See default-free zone (DFZ). The major ISPs system routers make up what could be considered to be the current Internet backbone core. ISPs operate all four types of the BGP-protocol routers described here. An ISP "core" router is used to interconnect its edge and border routers. Core routers may also have specialized functions in virtual private networks based on a combination of BGP and Multi-Protocol Label Switching protocols.

Port forwarding: Routers are also used for port forwarding between private internet connected servers.

Voice/Data/Fax/Video Processing Routers: Commonly referred to as access servers or gateways, these devices are used to route and process voice, data, video, and fax traffic on the internet. Since 2005, most long-distance phone calls have been processed as IP traffic (VOIP) through a voice gateway. Voice traffic that the traditional cable networks once carried Use of access server type routers expanded with the advent of the internet, first with dial-up access, and another resurgence with voice phone service.

10.5 SPREADSHEET

A table of values arranged in rows and columns. Each value can have a predefined relationship to the other values. If you change one value, therefore, you may need to change other values as well. *Spreadsheet applications* (sometimes referred to simply as *spreadsheets*) are computer programs that let you create and manipulate spreadsheets electronically. In a spreadsheet application, each value sits in a cell. You can define what type of data is in each cell and how different cells depend on one another. The relationships between cells are called *formulas*, and the names of the cells are called *labels*.

Once you have defined the cells and the formulas for linking them together, you can enter your data. You can then modify selected values to see how all the other values change accordingly. This enables you to study various what-if scenarios.

A simple example of a useful spreadsheet application is one that calculates mortgage payments for a house. You would define five cells:

1. Total Cost Of The House
2. Down Payment
3. Mortgage Rate
4. Mortgage Term
5. Monthly Payment

Once you had defined how these cells depend on one another, you could enter numbers and play with various possibilities. For example, keeping all the other values the same, you could see how different mortgage rates would affect your monthly payments.

There are a number of spreadsheet applications on the market, Lotus 1-2-3 and Excel being among the most famous. The more powerful spreadsheet applications supportgraphicsfeatures that enable you to produce charts and graphs from the data. Most spreadsheet applications are *multidimensional*, meaning that you can link one spreadsheet to another. A three-dimensional spreadsheet, for example, is like a stack of spreadsheets all connected by formulas. A change made in one spreadsheet automatically affects other spreadsheets.

> *Check your Progress*
>
> 3. What is CLI?
> 4. What is Project?
> 5. What is executive support system?

10.6 PROJECT

The project director of an information technology team is responsible for managing a project at the strategic level. The project director is typically the project's point person, managing resources and overseeing finances to ensure that the project progresses on time and on budget. The director reviews

regular progress reports and makes staffing, financial, or other adjustments to align the developing project with broader outcome goals. A project director generally oversees a team of project managers and project teams.

The project analyst provides critical data support to a technical team. Research and analysis functions may include budget tracking and financial forecasting, project evaluation and monitoring, maintaining compliance with corporate and public regulations, and performing any data analysis relevant to project tasks. Project analysts define key performance parameters and create regular variance reports to track progress.

10.7 COMMON

Created by Microsoft as the foundation of its .NET technology, the Common Language Infrastructure (CLI) is an ECMAstandard (ECMA-335) that allows applications to be written in a variety of high-level programming languages and executed in different system environments.

Programming languages that conform to the CLI have access to the same base class library and are capable of being compiled into the same intermediate language (IL) and metadata. IL is then further compiled into nativecode particular to a specific architecture.

Because of this intermediate step, applications do not have to be rewritten from scratch. Their IL only needs to be further compiled into a system's native code.

The *Web browser,* a software application used to locate, retrieve and also display content on the World Wide Web, including Web pages, images, video and other files. As a client/server model, the browser is the client run on a computer that contacts the Web server and requests information. The Web server sends the information back to the Web browser which displays the results on the computer or other Internet-enabled device that supports a browser.

10.8 EXECUTIVE SUPPORT SYSTEM

Executive Support System (ESS) is a reporting tool (software) that allows you to turn your organization's data into useful summarized reports. These reports are generally used by executive level managers for quick access to reports coming from all company levels and departments such as billing, cost accounting , staffing, scheduling, and more.

In addition to providing quick access to organized data from departments, some Executive Support System tools also provide analysis tools that predicts a series of performance outcomes over time using the input data. This

type of ESS is useful to executives as it provides possible outcomes and quick reference to statistics and numbers needed for decision-making.

The exact reporting tools and outcome of an Executive Support System completely depends on the ESS developer and it's intended industry use. For example, Cambridge Systematics has ESS to support the investment planning process for the Ministry of Transportation. The features and functions of this Executive Support System are entirely different from the Executive Support System developed by Meditech, which is useful to health care organizations.

Several companies offer pre-designed Executive Support System packages (usually suited to one particular industry), while others offer packages which can be customized your your organization's needs.

10.9 ANSWERS TO CHECK YOUR PROGRESS

1. It is a device that forward data packets between computer networks creating an overlay internet work.
2. It is computer programs that let create and manipulate spreadsheets electronically.
3. It is the Common Language Infrastructure that allows applications to be written in a variety of high level programming languages.
4. The project director of an information technology team is responsible for managing a project at the strategy level.
5. It is reporting tool that allows to turn the organization data into useful summarized reports.

10.10 REVIEW QUESTIONS

1. Explain Graphical usage interface concept.
2. How will you apply ROUTER in various inter-connected networks.
3. Explain Spreed Sheet?

10.11 REFERENCES

1. INVESTMENT MANAGEMENT – Theory and Practice – Sultan chand and Sons.
2. FUNDAMENTALS OF FINANCIAL MANAGEMENT – Ramesh K.S. Rao – Macmillan
3. PORTFOLIO MANAGEMENT – S. Kevin
4. SECURITY ANALYUSIS AND PORTFOLIO MANAGEMENT - S. Kevin
5. SECURITY ANALYSIS AND PORTFOLIO MANAGEMENT – M. Renganatham and R. Madhumathi

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